The American Statistician

A Publication of the American Statistical Association

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The Editorial Committee welcomes the submission of manuscripts for possible publication. Two copies, double-spaced, should be sent to the Editor, Morris Hamburg, E-230 Dietrich Hall, University of Pennsylvania, Philadelphia 4.

News and notes should be sent to Dana Barbour, News Editor, American Statistical Association, 1757 K Street, N.W., Washington 6, D. C.

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The President's Column

Walter E. Hoadley, Jr.

The ASA Is Growing Vigorously

The American Statistical Association is now certain to establish a new all-time record in membership in 1958. With an unprecedented gain—over 600 new members already added this year—total membership seems certain to approach 6,400, compared with 5,667 at the end of 1957.

To achieve a more than ten per cent increase in membership at a time of national economic recession is a striking indication of the growing importance of statistics, the statistical profession, and the ASA itself. Obviously this increase would not have occurred without the fine cooperation and promotional efforts of ASA members and officers throughout the country. May I express the sincere appreciation of the national officers and directors to everyone who has had a part in building our membership this year. With further determined effort, a goal of 7,500 members by 1960-61 should be definitely attainable.

An increase in membership obviously carries with it increased responsibility of the ASA to serve all of its members well. A great deal of attention is being given this year to precisely this subject. As you know, a large sample of the membership has been asked to comment on our publications program. If you received one of the publications questionnaires and haven't returned it to the Washington office, please do so immediately. As every statistician realizes, a large response to our questionnaire is essential if we are to achieve meaningful information from the survey.

The demand for new specialized publications continues to rise on all sides. For some time there has been a widespread request for a new journal to serve the rapidly expanding field of statistics in the physical and engineering sciences. It can now be reported that the ASA and the American Society for Quality Control are cooperating closely in taking the steps necessary to make such a new publication a reality in the not too distant

(Continued on Page 35)

NEWS

ASA ANNUAL MEETING — REPORT ON ISI MEETING — ASA MEMBERS ELECTED TO WASH. ACADEMY OF SCIENCES — FELLOWSHIPS AND GRANTS — NEW PUBLICATIONS — JOB OPENINGS — NOMINATIONS FOR BOARD AND COUNCIL

American Statistical Association Annual Meeting

DECEMBER 27 THROUGH DECEMBER 30, CONGRESS HOTEL, CHICAGO, ILLINOIS

The 1958 Annual Meeting will be held in Chicago, Saturday, December 27 through Tuesday, December 30. All of the ASA meetings will be in the Congress Hotel at 520 South Michigan Avenue, overlooking Chicago's Grant Park on Lake Michigan. The Congress is within walking distance of the "Loop," the hotels where other Social Science Associations will be meeting, and other points of interest.

HOTEL ARRANGEMENTS

Arrangements made with the Congress Hotel management provide for single rooms at $8.00, twin and double rooms (not lakefront) at $12.00, and lakefront rooms at $13.00. A postcard for making hotel reservations at the Congress will be mailed to ASA members. about November 1, along with a pre-registration form and other materials pertinent to attendance at the meeting.

ADVANCE REGISTRATION

For the convenience of members and to expedite registration those planning to attend are urged to make use of the preregistration form they will receive by mail. Submission of the form together with the $2.00 registration fee is all that is required to insure that valuable meeting time is not spent at the registration desk on the first morning.

TRANSPORTATION TO AND IN CHICAGO

Transportation to and from Chicago poses the least possible problem. Rail, air, bus, and auto routes into the city are readily accessible from all points. Airport limousine service is direct to and from the hotel. All rail stations are within a short taxi ride from the hotel, and inside parking facilities are available close to the hotel for those who arrive by private auto. Local transportation will not be a problem, since the Congress Hotel is located on the edge of the "Loop" area near the shopping, recreation, and other facilities likely to be used by participants. If you do want to ride, a Loop Shuttle Bus, boarded across the street from the Congress Hotel entrance, will take you up State Street to all hotels or other points of interest in the downtown area.

OTHER ASSOCIATIONS MEETING IN CHICAGO

Other Social Science associations meeting in Chicago during the same period are the American Economic Association, American Farm Economic Association, Catholic Economic Association, American Finance Association, and Econometric Society, at the Palmer House; the American Marketing Association at the Morrison Hotel; the American Association of University Teachers of Insurance at the La Salle Hotel; and the Industrial Relations Research Association at the Conrad Hilton Hotel. The Biometric Society (ENAR) will be at the Congress Hotel with ASA.

American Statistical Association members with headquarters at the Congress Hotel can readily make contacts and attend meetings of particular interest of the other Associations since all of the hotels are within walking distance of the Congress. Or, if desired, the Loop Shuttle Bus may be used.

EMPLOYMENT REGISTER

An employment register, operated by the Illinois State Employment Service, will serve members who desire to recruit and those who are seeking employment. Both recruiters and job seekers upon arrival should inquire at the A.S.A. information desk in the Congress Hotel as to the location of the placement office. It is recommended also that recruiters and job seekers write to the Illinois State Employment Service several weeks prior to the date of the meetings indicating their needs and interests. This will expedite service to all interested parties. Such letters should refer to the placement services being made available to American Statistical Association members at the annual meeting at the Congress Hotel, December 27 to 30 and should be addressed to:

Miss Grace Pergler, Supervisor
Professional Sales and Clerical Office
Illinois State Employment Service
73 West Washington Street
Chicago 2, Illinois

PROGRAM

A complete program of the Annual Meetings is presented elsewhere in this issue of THE AMERICAN STATISTICIAN.

It is the intention of the program and arrangements committees that for every member in attendance, the annual meetings be a thoroughly enjoyable and fruitful experience.

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ISI 31st Session

The 31st session of the International Statistical Institute was held in Brussels September 2-8. Approximately 350 statisticians were registered, with most countries that have members having some delegates. Over 40 registered from the United States.

A new organization of Municipal Statisticians within ISI has now been confirmed. This activity is of special interest to European statisticians. A new committee or section was also organized on Statistics in the Physical Sciences.

The Opening Ceremony was held in the Petit Auditorium at the Brussels Universal Exhibition. Professional proceedings were held in the new, permanent Albertine Building in Brussels which has been designed for congresses and international meetings, with three floors of rooms equipped with the newest simultaneous language interpretation equipment including individual microphones at each seat.

Sessions were held on statistical methods for the assessment of living conditions, the 1960 censuses of population, statistical problems of astronomy, statistical methods in the biological sciences, economic statistics, interdependent dynamic systems, sampling and experimental design. There were also a number of miscellaneous papers.

Receptions and dinners were held by the cities of Brussels, Ypres, and Bruges.

Japan has invited the Institute to meet in 1960 in Tokyo. The sessions will probably occur in late May or early June of that year. The Economic Commission for Asia and the Far East will probably meet at about the same time and the American Statistical Association's 1960 Annual Meeting will be held at Leland Stanford University in late August.

Social Science Research Council Fellowships and Grants

The Social Science Research Council has announced its program of grants and fellowships for 1959, a number of which may be of interest to statisticians. Predoctoral and post-doctoral Research Training Fellowships, to provide more advanced research training than that afforded by the usual Ph.D. program, are again being offered. Pre-doctoral fellowships are available only after fulfillment of all requirements for the doctoral degree except the dissertation, but applications may be submitted in anticipation of fulfilling these requirements within the ensuing year. Fellowships for Dissertation Completion, open to Ph.D. candidates who can complete the writing of their dissertations if freed from other occupations, are also available for terms ranging from a few months to a maximum of one year. The closing date for receipt of applications for the above fellowships is January 7, 1959.

Grants-in-Aid of Research and Faculty Research Grants, in amounts up to $6,000, to defray direct costs

or to provide free time for individual research, or both, are available to scholars who are no longer candidates for degrees and whose capacity for effective research has been demonstrated by previous work. In 1958-59, for the first time, these grants will be awarded both in January and in April, with closing dates for applications November 1 and February 2. International Conference Travel Grants equivalent to tourist-class fare for social scientists attending designated international meetings will also be available.

In addition to the foregoing appointments, for which individuals may apply directly, nominations are invited for Faculty Research Fellowships. These fellowships provide part-time release from other duties to a few college and university social science teachers, normally not over 35 years of age, for independent research for a term of three years. The closing date for nominations for these fellowships is January 7, 1959.

Interested persons should write to the Social Science Research Council, 230 Park Ave., New York 17, for further information. Requests for application forms should indicate age, permanent residence, highest academic degree held, present position or activity, and the purpose for which a fellowship or grant is desired.

Chicago Post-Doctoral Awards in Statistics

Awards for study in statistics by persons whose primary field is not statistics but one of the physical, biological, or social sciences to which statistics can be applied, are offered by the Department of Statistics of the University of Chicago. The awards range from $3,600 to $5,000 on the basis of an eleven month residence. The closing date for application for the academic year 1959-60 is February 16, 1959. Further information may be obtained from the Department of Statistics, Eckhart Hall, University of Chicago, Chicago 37, Illinois.

Educational Testing Service Psychometric Fellowships

The Educational Testing Service is offering for 1959-60 its twelfth series of research fellowships in psychometrics leading to the Ph.D. degree at Princeton University. Open to men who are acceptable to the Graduate School of the University, the two fellowships each carry a stipend of $2,650 a year and are normally renewable. Fellows will be engaged in part-time research in the general area of psychological measurement at the offices of the Educational Testing Service and will, in addition, carry a normal program of studies in the Graduate School.

Suitable undergraduate preparation may consist either of a major in psychology with supporting work in mathematics, or a major in mathematics together with some work in psychology. However, in choosing fellows, primary emphasis is given to superior scholastic attainment and research interests rather than to specific course preparation.

The closing date for completing applications is January 2, 1959. Information and application blanks may be obtained from: Director of Psychometric Fellowship Program, Eduactional Testing Service, 20 Nassau Street, Princeton, New Jersey.

ASA Members Elected to Washington Academy of Sciences

The following members of the American Statistical Association were elected to membership in the Washington Academy of Sciences at the March and June 1958 meetings of the Board of Managers, with citations as indicated:

Miss Besse Beulah Day — Consulting Statistician, Bureau of Ships

In recognition of her pioneer work in the statistical design of experiments in many fields particularly those of forestry and engineering and for her unique achievements in the exposition of statistical methods.

Mr. Wilmoth Duane Evans—Assistant Commissioner, Bureau of Labor Statistics

In recognition of his research in interindustry economics (input-output studies) and in the economics of technological change, also for contributions to the statistical theory of sampling.

Mr. Morris Howard Hansen—Assistant Director for Statistical Standards, Bureau of the Census

In recognition of his contributions to the theory of sampling finite populations, his leadership in applying modern methods to the improvement of Census statistics and his pioneering application of electronic computers to Census problems.

Dr. Stuart Arthur Rice—President, Surveys and Research Corporation

In recognition of his leadership in the development of improved statistical and reporting procedures in the United States, his assistance to other nations in organizing statistical programs, and his contributions to the achievement of greater comparability in international statistics.

The Washington Academy of Sciences, organized in 1898, acts as the head of a federation of 24 affiliated professional societies in the Washington area. The prime objective of the Academy is the promotion of science. It publishes a monthly scientific journal, holds monthly meetings, and promotes professional interest in science among young people of high school and college age in a variety of ways. Membership in the Academy is by election on the basis of original research or scientific attainment, and is restricted to one thousand persons.

NBER Appraisal of the 1950 Census Income Data

The quality and usefulness of data on income collected in the 1950 census are evaluated in a report issued last month by the National Bureau of Economic Research. The book presents the results of a Conference on Income and Wealth, at which leading economists from business, the universities, and government agencies were assembled.

The study is arranged in three parts. Part I contains papers of a general nature. Thomas R. Atkinson surveys frontiers of income distribution research, Edwin D. Goldfield reviews the history of income questions in census surveys, and Selma F. Goldsmith relates census and other income statistics.

Part II deals with comparisons of the census data and similar data available from other sources. This involves comparing answers to income questions in the census with income information obtained independently for the same, or "matching" income receivers from other surveys like the Survey of Consumer Finances, from administrative records such as the Internal Revenue Service personal income tax returns, and from the Census Bureau's own Post-Enumeration Survey. This part of the study contains papers by Monroe G. Sirken, E. Scott Maynes, and John A. Frechtling; by B. J. Mandel, Irwin Wolkstein, and Marie M. Delaney; by Herman P. Miller and Leon R. Paley; by Leon Pritzker and Alfred Sands; and by Marius Farioletti.

Part III, showing uses of census data on income, features articles by D. Gale Johnson, Ernest W. Grove, Eleanor M. Snyder, Herman P. Miller, and Lazare Teper.

Significant under-reporting of incomes in the 1950 census was revealed by the matching studies. The Census Bureau in its Post-Enumeration Survey, made to check the Census, uncovered 1.7 million more people with income than reported in the 1950 census and added about 4.1 per cent to total income reported. Indeed, the Internal Revenue Service's post-audit survey of 1949 tax returns reveals that under-reporting is a serious problem even for that Service, with its mandatory requirements, auditing of returns and punitive powers. The Conference study indicates that under-reporting is most serious for farm income, business and property incomes, and is smallest for wage and salary income.

The study devotes some attention to problems of interpretation. Eleanor Snyder points out the need for learning more about income status—i.e., income averaged over a period of years. Spending behavior of many families is governed more by income status than by income level during a particular year. The study also warns against thinking of personal income exclusively in terms of dollar income received currently. One aspect of this has long been recognized in agriculture, where significant amounts of "income in kind" are received by farmers without passing through the market-place. Other aspects are transformation of current income into capital gains, rearrangement of income flow over a lifetime to minimize the tax impact at the peak of earning capacity, and other recent trends in executive compensation, collective bargaining contracts, and investment policies of individuals.

The book entitled, "An Appraisal of the 1950 Census Income Data", was published for the National Bureau by the Princeton University Press. The price is $10.00 per copy.

NBER Critique of U. S. Income and Product Accounts

The National Bureau of Economic Research published in July a report which subjects to a critical evaluation the official national income and production figures. The report grew out of a meeting by the National Bureau's Conference on Research in Income and Wealth. Participants included members of the staff of the Office of Business Economics of the Department of Commerce, who prepare the estimates of national income; and analysts from other government agencies, business concerns, research organizations and universities. The report is the twenty-second in a series of volumes produced by the Conference since 1937.

One section of the report demonstrates the wide use of national income and product data by business concerns. In a survey sponsored by the American Accounting Association, 180 large companies were asked whether they used the figures and for what purposes. Of the 132 returning the questionnaire, 114 reported that they used the statistics. Forecasting of industry and company sales, both short-term and long-term, was one of the uses frequently reported. The survey indicated that national income data would be used even more widely if more detailed regional and industrial data were included and the estimates were made available more promptly.

Another section of the report stresses the importance, for short-run analysis of economic conditions, of eliminating regular seasonal variations from the monthly and quarterly income and product series. The importance of an accurate seasonal adjustment of the change in business inventories, an especially volatile component, is stressed. Certain defects in the seasonal adjustment of inventories in recent years are pointed out.

Other recommendations include improving and expanding estimates of savings, making estimates of depreciation on a replacement-cost as well as on an original-cost basis, separating figures on government purchases into purchases of durable goods and of other goods and services, and estimating depreciation of government capital equipment to permit calculation of government net capital formation.

The report, "A Critique of the United States Income and Product Accounts", is published for the National Bureau by the Princeton University Press. The price is $11.50 per copy.

Papers of 1958 Midwest Conference Available

The papers presented at the 5th Annual Midwest Conference, held in Chicago on March 15, 1958, are now available. The subject of the Conference, which was sponsored by the Chicago Chapter of the ASA in cooperation with the Chicago Association of Commerce and Industry, was "Looking at New Dimensions of Metropolitan Growth with Statistics". The papers and the authors are as follows:

Measurement of Population Changes and Future Trends in Metropolitan Areas—William Hodgkinson, Jr., American Telephone & Telegraph Co.

Measurement and Projection of Construction Activity in Metropolitan Areas—Clyde Shute, F. W. Dodge Corp.

Land Use Trends and the Real Estate Market in Metropolitan Areas—W. George Pinnell, Indiana University.

Factors Influencing Industrial Growth & Location—Charles F. Willson, Chicago Association of Commerce and Industry.

Methods for Measuring and Predicting Population Changes—Beverly Duncan, University of Chicago.

How to Measure & Project Labor Force Changes—Elizabeth Slotkin, Illinois Department of Labor.

New Types of Population—Housing Statistics Planned for the 1960 Census—Theodore F. Olson, U. S. Bureau of the Census.

Techniques for Measuring Housing Activity and Demand—William K. Wittausch, First Federal Savings & Loan Association.

How to Measure Industrial Capital Formation—George W. Cloos, Federal Reserve Bank.

Applications of Statistics in Selecting Industrial Locations—Ronald M. Reifler, Fantus Factory Locating Service.

Measuring Land Use for Commercial & Residential Needs—Paul O. Hedden, Planning Consultant.

Measuring Land Use for Transportation—John Hamburg, Chicago Area Transportation Study.

Use of Statistics in Metropolitan Area Planning—Ernest Melvin, Chicago Planning Department.

The papers may be obtained for 25 cents apiece, or $2.00 for the whole set, from Lawrence R. Stickler, 350 East 22nd St., Chicago 16.

UN Yearbook of National Accounts Statistics: 1957

The first issue of a new *Yearbook of National Accounts Statistics*, prepared by the Statistical Office of the United Nations, was published in July. It supersedes "Statistics of National Income and Expenditure" (Statistical Papers, Series H), presenting more detailed estimates for a larger number of countries.

The Yearbook contains detailed estimates of the following economic measurements for 70 countries: national product by type of expenditure and by industrial origin; national income by distributive shares; capital formation by type of capital goods, industrial use and purchaser; sources for the financing of capital formation; sector accounts for households and government; private consumption expenditure by category of goods and services; external transactions of the nation. To facilitate country comparisons, the estimates for most countries are set out in standard tables and conform to the international standards and definitions in this field. Data are presented for each year from 1950 to 1956, wherever available. The tables are well documented with explanatory notes and source information.

The Yearbook reports that the total volume of goods and services produced since 1950 has increased annually in most parts of the world, with however, a general slowing-up in the ratio of growth over the past four or five years. Western Germany continued its impressive economic growth, with an expansion of gross domestic product measured in constant prices of almost 9 per cent per annum between 1950 and 1956. The average annual expansion in the U. S. for the same period was 4 per cent; the corresponding per capita rate amounted to 2.1 per cent.

The *Yearbook of National Accounts Statistics: 1957* may be obtained from the United Nations Bookshop or the Columbia University Press, 2960 Broadway, New York 27. The price is $2.50 per copy.

Review of Early Federal Business Statistics

Readers who have been interested in the articles by Paul J. Fitzpatrick on statistical societies in this country during the 19th Century, early teaching of statistics in American universities and colleges, and statistical works in early American statistics courses, which have appeared in previous issues of THE AMERICAN STATISTICIAN,[1] will also be interested in an article on "Early Business Statistical Operations of the Federal Government", by Meyer H. Fishbein, in the June 1958 Issue of *National Archives Accessions*, a supplement to the National Archives Guide. In it, the author, who is head of the business economics branch of the National Archives, points out that the collection of business statistics in the United States, though often considered a modern development, antedates even the Constitution. The business statistics discussed in the article are limited to those pertaining to commerce and navigation, census enumerations, and agriculture.

The period covered, 1789 to 1890, is divided into three stages. The first stage, 1789 to the 1820's, was a period of rudimentary statistical techniques. Data were collected primarily to control foreign trade and to advance the national economy. The first manufacturing census in 1810, undertaken as part of the decennial census, was taken

[1] The December 1957, December 1955, and December 1956 issues respectively.

by U. S. marshals and their assistants. The objectives of the census and the industries covered were not clearly defined, and there were no questionnaires to guide the enumerators. The 1820 census of manufactures, while deficient in many respects, had at least forms and instructions which had been prepared by Secretary of State John Quincy Adams.

During the second stage, to the 1860's, emphasis shifted from manufacturing to agriculture, and considerable interest was also displayed in the growing internal commerce of the U. S. The modern statistical questionnaire was developed about this time. The American Statistical Association, which had been formed in 1839, was interesting itself in the improvement of national statistics.

In the last stage, roughly 1866 to 1890, statistics became professionalized and the fields covered were greatly broadened. Considerable attention was devoted to tabulation, which had been a limiting factor in early censuses. New statistical units were created under the direction of professional, though as yet self-trained, statisticians.

A limited number of copies of the June issue of *National Archives Accessions* are available and may be obtained from the Exhibits and Publications Branch, National Archives and Records Service, General Services Administration, Washington 25, D. C.

Pennsylvania Statistical Abstract

The Bureau of Statistics in the Pennsylvania Department of Internal Affairs has completed a *Pennsylvania Statistical Abstract*, the first such publication to be prepared for Pennsylvania. The purposes in preparing this volume were to assemble a comprehensive and integrated collection of up-to-date statistics for Pennsylvania, to present explanatory notes to accompany the statistics, and to publicize the many sources of data for Pennsylvania.

Modeled after the *Statistical Abstract of the United States* issued by the U. S. Bureau of the Census, the *Pennsylvania Statistical Abstract* is divided into 20 sections. Each section contains explanatory notes and information about the sources of the statistics. The sections are as follows: (1) Population, Income, and Housing; (2) Area, Climate, Public Land, and Park Systems; (3) Vital Statistics; (4) Accidents; (5) Education; (6) Social Insurance and Welfare Services; (7) Law Enforcement, Courts, and Prisons; (8) Elections and Registration; (9) State Finances and Revenue; (10) Local Government; (11) Prices; (12) Labor Force, Employment and Earnings; (13) Agriculture; (14) Mineral Production; (15) Construction; (16) Manufacturing; (17) Transportation; (18) Public Utilities; (19) Distribution and Services; and (20) Banking and Finance.

The sources of these statistics include 25 State government bureaus and six Federal agencies. Other sources were the Federal Reserve Banks of Philadelphia and Cleveland, the Institute for Life Insurance, and a special research unit on Population Redistribution and Economic Research at the University of Pennsylvania.

The Abstract contains 105 statistical tables and 22 graphs and map diagrams. Several of the tables present data which have not been published previously. Among these statistics are intercensal estimates of migration by color and sex for counties; data for children receiving services through supervised social agencies by type of placement; data on adoptions; data on persons in institutions for the aged; and judicial statistics by disposition and by type of offense. The explanatory notes describe the methods of collection and compilation of the statistics in each section and present definitions of the concepts used. Reference notes for each source of statistics in the Abstract are included as well as references to other sources of statistics on Pennsylvania.

Copies of the *Pennsylvania Statistical Abstract* may be purchased from the Division of Documents, 10th and Market Streets, Harrisburg, Pennsylvania, for $1.00. (Kenneth W. Masters, Director, Bureau of Statistics, Department of Internal Affairs, Commonwealth of Pennsylvania.)

HEALTH STATISTICIAN

To render consultant services in programs and projects of the Pan American Sanitary Bureau, Regional Office of the World Health Organization, with assignment to a Latin American country and travel to neighboring countries. Requirements: Professional degree, MD, PhD or equivalent in public health, with specialization and experience in health statistics. Attractive salary and allowances.

For further details write to

Personnel Officer, PASB/WHO
1501 New Hampshire Avenue, N.W.
WASHINGTON 6, D. C.

NOMINATIONS FOR 1959

The Committee on Nominations has nominated the following persons for office:

President-Elect

Morris Hansen, Bureau of the Census

Vice-President (1959-61)

(one to be elected)

George Garvy, Federal Reserve Bank of New York
Guy Orcutt, University of Wisconsin

Directors (1959-61)

(two to be elected)

Albert H. Bowker, Stanford University
Raymond T. Bowman, Office of Statistical Standards
Lucile Derrick, University of Illinois
Virginia T. Holran, Institute of Life Insurance

Representative-at-Large (1959-60)

(one to be elected)

Daniel O. Price, University of North Carolina
E. T. Weiler, Purdue University
John T. Marshall, Dominion Bureau of Statistics
Almarin Phillips, University of Virginia

The following have been nominated by their respective districts:

District Representative (1959-60)

(one to be elected from each district)

District

#1 New England States (except members of New York City Chapter)
Colin White, Hamden, Conn.

#2 New York State (except New York City and members of that Chapter), Ontario, Quebec, Maritime Provinces
Charles M. Armstrong, Albany, N. Y.
Basil Y. Scott, Albany, N. Y.

#3 New York City, including members of the Chapter living in the metropolitan and commuting areas, and Puerto Rico
William Abraham, New York City
Paul Densen, New York City

#4 New Jersey (except members of New York City Chapter), Pennsylvania, Delaware
Martin B. Wilk, Murray Hill, N. J.
Robert Hooke, Pittsburgh, Pa.

#5 Maryland, District of Columbia, Metropolitan and Commuting Areas of Washington, D. C. in Northern Virginia
Malcolm Catlin, Washington, D. C.
Benjamin J. Mandel, Baltimore, Maryland

#6 Virginia (except as in 5), West Virginia, Kentucky, North Carolina, Tennessee, South Carolina, Georgia, Alabama, Florida
David B. Duncan, Chapel Hill, N. C.

#7 Ohio, Michigan
Michail V. Condoide, Columbus, Ohio
Melvin C. Koch, Columbus, Ohio
Paul Rider, Dayton, Ohio
Harry Smith, Cincinnati, Ohio

#8 Indiana, Illinois, Wisconsin, Minnesota, Iowa, the eastern part of Missouri
Donald L. Cheak, Indianapolis, Indiana
Herbert T. David, Ames, Iowa

#9 Alberta, Manitoba, Saskatchewan, North Dakota, Montana, South Dakota, Wyoming, Nebraska, the western part of Missouri, Kansas, Colorado, Arkansas, Oklahoma, New Mexico, Mississippi, Louisiana, Texas
Virgil C. Childs, Austin, Texas
Edwin L. Crow, Boulder, Colorado
Milton F. Searl, Tulsa, Oklahoma
John R. Stockton, Austin, Texas

#10 Alaska, British Columbia, Idaho, Washington, Oregon, Utah, Nevada, California, Arizona, Hawaii
Hugh H. Brown, Los Angeles, Cal.
Raymond E. Franzen, Honolulu, T.H.

Job Openings

The Biometrics Division, Office of the Surgeon General, Headquarters U. S. Air Force, has an opening for an analytical statistician (Health and Medicine) at grade GS-11, the starting salary of which is $7,030 per year. Further information may be obtained from Dr. H. M. C. Luykx, Chief of the Biometrics Division, Office of the Surgeon General, Headquarters U. S. Air Force, Washington 25, D. C.

The Oregon State Civil Service is recruiting to fill an actuarial position with the State Department of Insurance at Salem, Oregon. The salary range is from $655 to $810 per month. A person may be appointed above the minimum of the range, depending upon his qualifications. Applicants must have had two years of progressively responsible experience in the conduct of actuarial or advanced statistical studies, preferably supplemented by one year of graduate study in actuarial science. Interested persons should write to Deryl G. Currie, Recruitment Officer, State Civil Service Commission, Salem, Oregon.

The New York State Department of Civil Service will conduct examinations on December 13 to fill higher-level positions in the State Education Department. Among the many titles included in the tests are:

Associate in Education Research—$7890 to $9540.
Chief, Bureau of Statistical Services—$9700 to $11,590 (no written test)

These tests, as well as others, are open to any qualified United States citizen. For full details, write before November 14, to Recruitment Unit, Box H3, Department of Civil Service, the State Campus, Albany, New York.

STATISTICIAN-BIOLOGIST

Statistician-biologist or plant physiologist. PhD or equivalent. Broad experience in machine method data handling required. Will plan data collection and reduction for overall air pollution control program in San Francisco Bay Area. Will act as staff advisor and special investigator for all aspects of air pollution control program, including agricultural.

Salary to $10,000 depending on qualifications.

For information, write Bay Area Air Pollution Control District, 1480 Mission Street, San Francisco 3, California.

FEDERAL STATISTICAL ACTIVITIES

1959 Appropriations for Principal Statistical Programs

I. *Current Program*

The Budget estimates for 1959 included about $34,750,000 for the principal current statistical programs of the Federal Government, as described in Special Analysis I of the 1959 Budget Document. Final action on these appropriation requests allowed $33,633,000—an increase of $757,000 over 1958 but a reduction of $1,115,000 from the Budget estimates.

The amounts available for 1958, the requests for 1959, and the amounts available for 1959 are shown by agency and by broad subject areas in the accompanying tables. Both tables show totals for 1958 and 1959 with and without adjustment for the pay increase enacted in June, retroactive to January 1, 1958. For purposes of comparability, the separate program and agency figures are shown without adjustment to the new salary base.

The 1959 recommendations on statistical budgets included increases totaling about $1.5 million for an integrated program of improvements in current economic statistics. Final action on the 1959 appropriations reduced this amount to about $650,000.

The proposals comprising this integrated program were included in the 1959 Budget estimates of the Bureau of the Census and the Office of Business Economics in the Department of Commerce and the Bureau of Labor Statistics in the Department of Labor. A brief summary of the proposals, indicating the amounts requested and the amounts which will be available in 1959, is given below. The figures refer to the estimated costs of the specific proposals, and do not take into account various adjustments reflecting savings and minor shifts within allocations.

Bureau of the Census

Increases totaling $975,000 for projects included in the over-all program for improving economic statistics were the major part of the Census Bureau's requested increase of $1,038,200. The increase allowed for the Bureau was reduced to $168,200. This increase supplemented by $235,800 anticipated as a result of nonrecurring costs, introduction of efficiencies, and other reductions in costs from 1958 will permit a start to be made on a number of the projects proposed for 1959.

In the area of production and distribution statistics, increases totaling $375,000 were requested: $100,000 to expand existing retail and wholesale inventory surveys and provide estimates of inventories for key commodities; $100,000 to initiate a monthly survey to provide reliable estimates of service trade receipts; $100,000 to obtain a monthly measure of accounts receivable (consumer credit) for retail trade; and $75,000 to improve the Monthly Industry Survey of manufacturers' sales, inventories and new orders. As a result of the reduction in the Budget estimate, less than 60 percent of the amount requested for these projects will be available in 1959. With the funds which are available, improvements are being initiated in the Monthly Industry Survey of manufacturers with the objectives of increasing its accuracy, achieving prompter release of the data, and providing more detailed figures classifying sales and inventories by major product classes. Work will also be started, although on a more limited basis than planned, on the projects for developing retail and wholesale trade inventory estimates for some key commodities and for developing monthly measures of retail accounts receivable. No work is planned this year on collection of data on service trade receipts.

In the area of construction statistics, an increase of $500,000 was requested to make a quarterly survey of expenditures on additions, alterations, maintenance, and repairs of residential properties and to develop a survey of such expenditures for nonresidential properties; and to conduct surveys to improve the reliability of the monthly estimates of total construction activity. Only about one fourth of the increase requested will be available. A start will be made on a data collection program to improve estimates of new private nonresidential construction.

In the area of improving statistics for the national accounts, an increase of $100,000 was requested to initiate sample surveys to provide quarterly estimates of State and local government revenue, expenditure, indebtedness, and financial assets. No funds will be available for this project in 1959.

Office of Business Economics

The increase of $282,000 in the 1959 Budget estimate for the Office of Business Economics was reduced by Congressional action to $115,000. The proposed increase was designed to provide for the following projects: $202,000 for several specific projects to extend and improve the national income accounts; $20,000 to restore the quarterly reports on business births and deaths; $50,000 to prepare a survey of United States private investments in foreign countries (for the first of a two-year program); and $10,000 for publication of the 1959 Business Statistics supplement to the Survey of Current Business.

For the improvements proposed in the national income field, the increase allowed for 1959 will permit the Office of Business Economics to complete the preparation of quarterly estimates of gross national product in constant

dollars, and to initiate a limited amount of work on the preparation of net output measures and on the estimation of purchases and sales, by industry. It will not be possible in 1959 to establish a separate research staff, as recommended by the National Accounts Review Committee, to work on basic conceptual and structural problems in the national accounts.

With the increase allowed for 1959, the Office of Business Economics has also initiated work on the survey of foreign investments—the first since 1950—and will publish the 1959 edition of Business Statistics.

Bureau of Labor Statistics

Of the $372,000 increase in the 1959 Budget estimate for the Bureau of Labor Statistics, $285,000 was requested for projects which were part of the integrated program for improving economic statistics—$100,000 for specific improvements in the area of wholesale and retail price statistics, including improvements in the quality of price data (particularly wholesale prices for industrial equipment, machine tools and other capital goods) and development of improved price deflators; $100,000 for three additional projects on statistics of employment and hours of work; and $85,000 for expansion of productivity estimates to additional industries and industry sectors. Congressional action allowed the Bureau of Labor Statistics a total increase of $224,500 out of the $372,000 requested for 1959.

In the area of price statistics, the additional $100,000 requested will be available in 1959 but part of the increase will be used for projects recommended by the Congress which had not been included in the 1959 Budget estimate. The list of commodities priced for the Wholesale Price Index will be expanded, with emphasis on series related to capital equipment, and a quality control program will be initiated to provide a more adequate review and evaluation of prices currently collected at the primary market level. Attention will also be given to improvement of prices collected for the Consumer Price Index, especially for the medical care component. Work will continue on the City Worker's Family Budget and on a Budget for Elderly Couples.

In the area of labor statistics, about one half of the $185,000 increase requested for additional detail in the employment and hours series and for extension of productivity estimates to additional industries will be available in 1959. An annual survey will be initiated to determine the relationship between "hours paid for" and "hours worked" in manufacturing industries. Collection of information on nonproduction workers in manufacturing industries will either be postponed or undertaken on a very limited basis, and extension of the employment series to important nonmanufacturing industries will not be possible in 1959. Some new studies of trend and technological factors will be undertaken in the productivity program, but will probably be limited to 2-digit industries.

II. *Periodic Census Programs*

For the periodic census programs, all of which are conducted by the Bureau of the Census, final action allowed $14,350,000 of the $14,695,000 requested, as shown in the following tabulation:

	1958 appropriation	1959 Budget estimate	1959 appropriation
	(In thousands. Figures exclude pay increase adjustments.)		
1958 Censuses of Business, Manufactures, and Mineral Industries	$1,000	$ 7,300	$ 7,000
1960 Censuses of Population and Housing and 1959 Census of Agriculture	3,250	7,000	7,000
1957 Census of Governments	—	395	350
Total, periodic censuses	4,250	14,695	14,350

1958 Censuses of Business, Manufactures, and Mineral Industries

Collection of information for the 1958 economic censuses will begin early in calendar year 1959. The $7 million appropriation for fiscal year 1959 will provide for the printing, mailing and collection of most of the report forms for these censuses, and for some of the editing which will be started as the schedules are returned. Funds for completion of editing and for tabulation and printing of the reports will be requested for fiscal years 1960 and 1961.

1960 Censuses of Population and Housing and 1959 Census of Agriculture

Intensive preparatory work for the 18th decennial census, which includes the censuses of population, housing, and agriculture, was started in fiscal year 1958 and will continue in 1959. An objective in these censuses is to achieve faster release of tabulated results through extension of sampling and by use of electronic equipment for processing and tabulating the returns. The $7 million appropriated for fiscal year 1959 provides for final determination of the questions to be asked and procedures to be employed, preparation of enumeration maps, printing of questionnaires and related forms, and field testing of procedures and schedules. It also includes about $2.1 million for completion of the purchase of the major components of electronic equipment needed for rapid and economical processing of census results. The cost of these censuses, including preparatory work, will spread over six fiscal years.

1957 Census of Governments

The total cost of the 1957 Census of Governments was originally estimated at $2.1 million. An appropriation of $1,750,000 was made in fiscal year 1957, of which about $1,650,000 was obligated in fiscal years 1957 and 1958. For fiscal year 1959 a final appropriation of

$395,000 was recommended—the balance of $350,000 for the total estimated cost of the census plus $45,000 required by legislation enacted since the time of the original estimate, such as direct agency contributions to the civil service retirement fund. The appropriation of $350,000 made will be used to complete processing phases and to tabulate and publish the final results.

TABLE 1.

Appropriations or Allocations for Principal Current Statistical Programs, by Broad Subject Areas (In Thousands)

	1958 appropriation	1959 Budget estimate	1959 appropriation
Labor statistics	$ 7,237	$ 7,421	$ 7,277
Demographic statistics	4,396	4,540	4,540
Prices and price indexes	3,218	3,324	3,321
Production and distribution statistics	12,653	13,219	12,924[1]
Construction and housing statistics	753	1,233	858
National income and business financial accounts	4,619	5,010	4,743
Total, excluding pay increase adjustments	32,876	34,748	33,663
Estimated pay increase adjustment	1,173	2,896	2,896
Total, including pay increase adjustment	34,049	37,644	36,559

[1] Includes $100,000 not included in Budget estimate.
(Detail will not necessarily add to totals because of rounding.)

TABLE 2.

Appropriations or Allocations for Principal Current Statistical Programs, by Agency (In thousands)

Agency	1958 appropriation	1959 Budget estimate	1959 appropriation
Department of Agriculture			
Agricultural Marketing Service—			
Economic and statistical analysis	$ 1,536	$ 1,535	$ 1,535
Crop and livestock estimates	5,576	5,576	5,676[1]
Agricultural Research Service—			
Farm economics research	2,709	2,709	2,709
Department of Commerce			
Bureau of the Census	7,882	8,920	8,050
Business and Defense Services Administration — Construction statistics	142	160	160
Office of Business Economics	1,035	1,317	1,150
Department of Health, Education, and Welfare			
Office of Education—			
Research and statistical services	583	597	597
Public Health Service—			
National Office of Vital Statistics	1,513	1,513	1,513
Public health methods and reports	1,800	1,936	1,936
Department of Labor			
Bureau of Labor Statistics	7,200	7,572	7,424
Treasury Department			
Internal Revenue Service—			
Statistical reporting	2,500	2,500	2,500
Federal Trade Commission			
Financial Reports	210	210	210
Securities and Exchange Commission			
Section of Economic Research	190	202	202
Total, excluding pay increase adjustment	32,876	34,748	33,663
Estimated pay increase adjustment	1,173	2,896	2,896
Total, including pay increase adjustment	34,049	37,644	36,559

[1] Includes $100,000 not included in 1959 Budget estimate.
(Detail will not necessarily add to totals because of rounding.)

Release of Data from the 1956 National Housing Inventory

Publications now available and planned for the three types of data collected by the Bureau of the Census in the 1956 National Housing Inventory are:

Components of change.—Volume I of the 1956 National Housing Inventory comprises nine bulletins on "Components of Change 1950 to 1956" issued in June, July and August, each showing data for one standard metropolitan area, and a tenth bulletin to be issued later in 1958 with data for the United States and regions. The standard metropolitan areas included in the survey were: Atlanta, Boston, Chicago, Dallas, Detroit, Los Angeles, New York and Northeastern New Jersey, Philadelphia, and Seattle. The bulletins may be purchased at 25 cents each from the Bureau of the Census, Washintgon 25, D. C., or from any of the Field Offices of the U. S. Department of Commerce. The information in the bulletins was summarized earlier in press releases issued during 1957.

Financing of owner-occupied properties.—Preliminary data were issued in July in a press release, with figures for 1950 and 1956 on the total number of owner-occupied one-dwelling-unit properties and on the number and amount (total and average) of outstanding mortgages, with separate data for first mortgages ("insured or guaranteed" and "conventional") and junior mortgages. Copies of the release may be obtained from the Housing Division, Bureau of the Census, Washington 25, D. C. The information will be issued later in 1958 as Volume II of the 1956 National Housing Inventory.

Housing characteristics.—Data on housing characteristics will be published before the end of 1958 in Volume III of the 1956 National Housing Inventory. This volume will consist of 10 bulletins—one for each of the nine standard metropolitan areas and one for the United States. No preliminary releases are planned for these reports.

—J. Hugh Rose, Chief,
Structural Statistics Branch,
Housing Division,
Bureau of the Census,
Department of Commerce

Revision of Weighting Structure of Wholesale Price Index

The Bureau of Labor Statistics has completed a revision of the weighting structure of the Wholesale Price Index, in accord with its policy to revise the WPI weights whenever comprehensive data from the industrial censuses become available. Figures for January, February, and March 1958, constructed with the new weights, were presented for the first time in the March release and detailed report.

The new weighting structure incorporates statistics on net selling value of commodities in the year 1954 as reported in the 1954 Census of Manufactures and Census of Mineral Industries, and various data furnished by the Bureau of Mines of the Department of the Interior, the Department of Agriculture, and other sources. From January 1947 through 1954 the weights were based primarily on the 1947 industrial censuses. Adjustments were made in January 1955 to align the major group weight totals with the 1952-53 average shipment values, but this did not represent as complete a weight revision as the one now being introduced.

The current revision of weights leaves the WPI concept basically unchanged. The index, as before, represents the price movement of the aggregate of commodities produced and processed in this country (or imported), and flowing into primary markets. The weights represent the net selling values in the weight base reference period, in this case 1954. These values are f.o.b. production point and exclusive of excise taxes. Special attention was given to development of data on interplant transfers. These are excluded, as are military products and goods sold at retail directly from producing establishments. A major change in pricing methods for gas and electricity brings the methods employed for these series closer to those for the rest of the WPI.

About 90 new items have been added to the index, mostly in the machinery and metals group; and 58 items have been dropped because of their declining importance in terms of value of shipments.

Additional information on the weight revision and a comparison of the new and old weights by commodity categories is contained in the detailed report on "Wholesale Prices and Price Indexes" for March 1958, available from the Bureau of Labor Statistics, Washington 25, D. C.

—Sidney A. Jaffe, Division of Prices and Cost of Living, Bureau of Labor Statistics, Department of Labor

Regional Conference on Educational Statistics

A one-day conference of users and suppliers of educational statistics in the New England region was conducted by the Office of Education in Boston on June 19. This was the first of a proposed continuing series of regional conferences, implementing a recommendation of the Advisory Committee on Educational Statistics that the Office of Education establish closer working relationships with suppliers and users of its statistics.

The New England conference was attended by 57 persons, including superintendents, business managers and board members of public school systems and representatives of teachers' associations, State departments of education, schools of education, business and labor organizations, the press, and the Office of Education. The program for the conference included two general sessions, round-table discussion groups, and an exhibit of statistical publications relating to education. Discussion was limited to elementary and secondary schools.

The response to the objectives and accomplishments of the conference was encouraging, although there was general agreement that one day did not allow time for adequate discussion. It appears that a concrete result of the conference will be the establishment, on their own initiative, of a regional association of users and suppliers of educational statistics in New England.

—Joseph W. Kappel, Assistant Director, Research and Statistical Services Branch, Office of Education, Department of Health, Education, and Welfare

Minerals Yearbooks for 1954, 1955 and 1956

In the first nine months of 1958 the Bureau of Mines will have issued nine volumes of the Minerals Yearbook, representing complete sets of three volumes for each of the years 1954, 1955 and 1956. This works off the backlog of Yearbooks which had accumulated in the war years and has prevented their current publication. For the 1954 Yearbook, Volume I, Metals and Minerals (except Fuels) was issued in March; Volume II, Fuels, was issued in May; and Volume III, Area Reports, in March. For 1955, Volumes I and III were issued in June and Volume II in July. For 1956, Volume I was issued in August, Volume II in July, and Volume III will be issued in September.

New indexes of the physical volume of mineral production by groups and subgroups, 1880-1956, are presented in Volume I of the 1956 Yearbook. These indexes represent the work of persons in the Office of Statistical Standards, Bureau of the Budget, and in the Bureau of Mines. They were originally presented in an article by Y. S. Leong of the Office of Statistical Standards in the March 1950 issue of the JOURNAL OF THE AMERICAN STATISTICAL ASSOCIATION, and have been brought up to date, using essentially the same methods, by Robert E. Herman of the Office of the Chief Economist, Bureau of Mines. An interesting new table introduced in the 1955 Area Reports Volume is a checklist which indicates the minerals produced in each State during the year.

It is expected that Volume I of the 1957 Minerals Yearbook will be published before the end of 1958, with the remaining volumes on Fuels and Area Reports ap-

pearing early in 1959. The ultimate aim is to release all volumes before the end of the year following the calendar year covered by the data.

The improved schedule for the release of the completed volumes has stepped up the release of individual chapter preprints. All chapter preprints for 1956, for example, were released before June 2. Many of the important statistical series carried in the Yearbook chapters also appear even earlier in preliminary and final Mineral Market Surveys.

—Rexford C. Parmelee, Chief Statistician,
Bureau of Mines,
Department of the Interior

Among Recent Publications—

1958 Statistical Abstract of the United States, issued by the Bureau of the Census, Department of Commerce. Statistical yearbook presenting economic, social and political data from a wide variety of sources. 1958 edition contains 1,197 tables (including 62 not contained in previous issues), 42 charts, a 44-page alphabetical subject index, and a 40-page bibliography of statistical sources. Brief text summations precede each of the 34 subject sections. The data were obtained from 89 government agencies and 59 private sources. Most of the data presented are on an annual basis and are primarily national in scope, although statistics for regions and States are given in more than 200 tables and figures for cities and standard metropolitan areas are shown in a small number of tables. The new edition includes more tables presenting current-year figures than past editions. Available at $3.75 a copy (1,052 pages) from the Superintendent of Documents, Government Printing Office, Washington 25, D. C.

County Business Patterns, First Quarter 1956, issued by the Bureau of Old-Age and Survivors Insurance, Social Security Administration, and the Bureau of the Census. Eighth in the series of reports showing county-industry statistics derived from social security tax returns, and first comprehensive county compilation of wage and employment statistics since the 1954 Censuses of Business, Manufactures, and Mineral Industries. The new edition consists of 11 parts:

Part 1 United States Summary	$ 1.50
Part 2 New England States	1.00
Part 3 Middle Atlantic States	1.50
Part 4 East North Central States	2.50
Part 5 West North Central States	2.25
Part 6 South Atlantic States	2.25
Part 7 East South Central States	1.50
Part 8 West South Central States	1.75
Part 9 Mountain States	1.25
Part 10 Pacific States	1.00
Part 11 Outlying Areas	.50
Complete set (11 parts)	17.00

The information covers mid-March 1956 employment, first quarter 1956 taxable payrolls, and number of reporting units by employment size. The statistics are distributed by detailed industry groups for the United States and for each State and county, and the present issue shows greater industry detail than previous issues. The text describes the sources of the data, compilation procedures, scope and completeness, and comparability with other data. Available at prices indicated from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. or from field offices of the U. S. Department of Commerce.

Financing Small Business, report by the Federal Reserve System issued as a joint print by the Committee on Banking and Currency and the Select Committees on Small Business of the Congress. Part I, "Background Studies," includes 16 papers on various aspects of small business important from the point of view of their financing, and a summary paper. The papers, based largely on existing data and materials, were prepared independently by scholars at leading universities and other private organizations and individual members of the Federal Reserve research staff. Part II, "Surveys of Credit and Capital Sources," includes a summary and analysis of data obtained through surveys (both mail and interview) of commercial banks, commercial finance companies and factors, trade creditors, life insurance companies, and investment companies and others supplying equity capital. The surveys were conducted and the results analyzed by the Federal Reserve research staff. Part III—a longer range experimental effort to obtain information on the financial structure, practices and problems of small business concerns through mail questionnaires to or interviews with the businessmen themselves—is still in the planning stage, and results will not be available for at least a year. Report containing Parts I and II available at $1.50 per copy (549 pages) from the Superintendent of Documents, Government Printing Office, Washington 25, D. C.

Balance of Payments Statistical Supplement, issued by the Office of Business Economics, Department of Commerce, as a supplement to the *Survey of Current Business*. Contains annual data on the balance of payments of the United States since 1919, quarterly data from 1945, and annual and quarterly data by areas from 1946. Merchandise trade figures are grouped into new categories related to United States production and demand, international expenditures, and receipts from major service transactions such as those arising from transportation, travel and military operations abroad. Tables on direct private investments abroad show by country and major industry group the value of the investments, flow of capital, and earnings. U. S. Government grants and credits are shown by programs and by countries since 1945. Available at $1.00 a copy (192 pages) from the

Superintendent of Documents, Government Printing Office, Washington 25, D. C., or from the field offices of the U. S. Department of Commerce.

Farmers' Expenditures in 1955 by Regions for Production and Farm Living with Tables on Off-Farm Income (Statistical Bulletin No. 224), issued by the Department of Agriculture. Based on information obtained in the survey of production and family living expenditures made early in 1956 by the Agricultural Marketing Service in cooperation with the Bureau of the Census. Expenditure data are summarized by expenditure categories for eight regions. Data are also presented on average expenditures per farm, off-farm income by source of income, and other topics. Available at $1.00 per copy (135 pages) from the Superintendent of Documents, Government Printing Office, Washington 25, D. C.

Highlights of Conference on Research and Development and Its Impact on the Economy (Reviews of Data on Research and Development, No. 11), issued by the National Science Foundation. Bulletin summarizing the conference held on May 20, concerned with the social and economic implications of research and development. Available from the Public Information Office, National Science Foundation, Washington 25, D. C.

Health Statistics from the U. S. National Health Survey, issued by the Public Health Service, Department of Health, Education, and Welfare. Series A reports relate to technical and methodological procedures, and Series B reports present data obtained in the national sample survey of households. Issued since June:

Series A 1, "Origin and Program of the U. S. National Health Survey," presenting background information on the survey program and on the need for health statistics and description of the survey policies and program, including discussion of potentialities and limitations. (25 cents)

Series A 2, "The Statistical Design of the Health Household-Interview Survey," presenting a description of the structure of the household interview-survey procedure and sample design intended to be readily readable by all professional persons concerned with health problems or interested in research methods, supplemented by a series of technical appendixes giving details of the survey design and procedures. (35 cents)

Series B 4, "Preliminary Report on Disability, United States, July-September 1957," presenting estimates on the numbers of persons who were confined to bed, stayed home from work, or merely cut down on usual activities because of illness or injury, by age, sex, and urban-rural residence. (30 cents)

Copies of the reports may be purchased at the prices indicated from the Superintendent of Documents, Government Printing Office, Washington 25, D. C.

Local Population Estimates Prepared by State and City Agencies: 1957-58 (Current Population Reports, Series P-25, No. 178), issued by the Bureau of the Census, Department of Commerce. Presents in tabular form the names and addresses of agencies preparing State or local population estimates, the areas and population groups for which the latest estimates were prepared, the date of reference of the estimates, the method used to make the estimates, and notes on the availability of copies of the estimates. The text of the report summarizes the types of agencies making county and city population estimates and the methods used, and discusses the relative accuracy of various methods of estimating State and local population. The report is based on a survey made in the spring of 1957 and brought up to date early in 1958, in which questionnaires were sent to State health departments, State universities, State planning commissions, and State employment security offices, and to similar agencies in the 41 cities with a population of 250,000 or more in 1950. Available from the Population Division, Bureau of the Census, Washington 25, D. C.

Concepts and Methods Used in the Current Employment and Unemployment Statistics Prepared by the Bureau of the Census (Current Population Reports, Series P-23, No. 5), issued by the Bureau of the Census, Department of Commerce. Report dealing with concepts, data collected and published, the survey design, estimation procedure, adequacy of the data, comparability with related data, quality control procedures used in the survey, and a chronology of major changes and improvements in the Current Population Survey since its inception. Supersedes two earlier issues (Series P-23, Nos. 2 and 3). Available at 25 cents a copy (14 pages) from the Bureau of the Census, Washington 25, D. C.

Employment Security Research Exchange, issued by the Bureau of Employment Security, Department of Labor. First issue, released in September, of a new semiannual report presenting a summary of research projects planned, in progress, completed, or carried forward on a continuing basis by the research sections of State employment security agencies. The summary is based on information in semiannual reports to the Bureau of Employment Security from affiliated State agencies. The 35 or more subject-matter fields of State employment security research have been classified for analytical purposes (including a discussion of the methodology utilized) under six main heads: job opportunities research; unemployment insurance program research; unemployment insurance financing research; improving employment and other establishment data; improving unemployment and related labor force data; and special manpower and labor market studies. A "scorecard" shows which State agencies are engaged in each of these six major areas of unemployment security research.

Copies may be obtained from the Division of Technical Publications, Office of Program Review and Analysis, Bureau of Employment Security, Department of Labor, Washington 25, D. C.

CORRELATIONS AMONG TIME SERIES AND MOORE'S STATISTICAL INDICATORS

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Wesleyan University

A recent exchange between Stefan Valavanis and Geoffrey Moore invites attention to one of the most important unresolved issues in statistical analysis, namely, the proper procedure for assessing the significance of relationships among time series.[1] The particular subject of discussion in that exchange was the statistical significance that can be attributed to the behavior of those time series selected by Moore to forecast cyclical movements in busines sactivity. It is apparent that an answer to this question of significance is invaluable not only for prediction in the present instance but also in the whole field of time series analysis. It is to this general question and to this particular application that the following discussion is addressed.

To illustrate the nature of this problem, the standard test of significance of the correlation coefficient may first be considered. Suppose we have 96 monthly observations on two time series, say, industrial production and residential construction contracts (square feet); we seek to measure the degree of association exhibited by these series.[2] The simple correlation coefficient, r_s, proves to be .830. Looking in the ordinary tables of significant values of r, we see that only once in a hundred times would we expect by random sampling to get a value of r as great as .262 from a normal, bivariate universe with an actual correlation of zero. That is, the probability is .01 of getting a value as large or larger than .262 merely due to chance fluctuations in the values sampled. Since our value, $r_s = .830$, is much larger than .262, the probability is less than .01 that our sample came from a universe such as that specified in the assumptions. We conclude that there is a closer association between our variables, residential construction contracts and industrial production, than can be attributed to chance.

But what about the assumptions underlying the preceding test, namely, that the distribution of sample coefficients approaches the normal curve and is centered about the true universe value, with standard deviation derived from simple probability calculations?[3] Now, indeed, these assumptions will be fulfilled if the observations are randomly drawn from a normal population. But if random drawing is not achieved, that is, if successive observations are not independent of one another, then the sampling distribution may not follow the normal curve and its standard deviation may not be so readily estimated. It is this lack of independence between values that characterizes time series and renders inappropriate the application of standard tests of significance. Let us see concretely what this lack of independence means and how it affects the significance of correlations.

It is well known to students of time series analysis that one fairly accurate way of "predicting" next month's value for such a series as, say, the index of industrial production, is to predict that next month's value will be the same as this month's. The reason for the accuracy of this kind of forecasting is that the index changes only gradually and rarely rises or falls by more than two or three points from one month to the next. This continuity property is revealed in the fact that given values of the index are highly correlated with earlier values. Thus, if we correlate the monthly index with itself lagged one time period, for the interval 1948 through 1954, we get a correlation coefficient of .992 (the value at a one percent level of significance is .281). If we correlate with a lag of two periods, we get .967; if correlations with greater lags are calculated, the coefficients tend to fall although to a lag of 18 months they are significantly different from zero. Autocorrelation coefficients for various lags are shown in Part A of Table I and the method of aligning the series for calculating them is illustrated in Part B. (This illustration will be helpful later on in explaining how regression systems are constructed for forecasting purposes.)

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[1] Stefan Valavanis, "Must the Diffusion Index Lead," *The American Statistician*, Vol. 11, No. 4, October, 1957, with Comment by Geoffrey Moore and Rejoiner by Valavanis, pp. 12-16. The discussion that follows here is meant to serve as a suggestive introduction to certain problems of statistical testing, not as an exhaustive treatment.

I am indebted to Moore for valuable comments upon a draft of this discussion. Although Valavanis had read an early version, his untimely death occurred without his having commented upon the manuscript.

[2] As will become apparent in the material that follows, the illustrations developed here are from a detailed study of Moore's statistical indicators, a study that uses the Federal Reserve Board's index of industrial production as its measure of movements in general business activity. See my "Forecasting Industrial Production," *Journal of Political Economy*, Vol. LXV, No. 2, Apr., 1957, pp. 158-165, and Moore's "Forecasting Industrial Production—A Comment," *Journal of Political Economy*, Vol. XLVI, No. 1, Feb., 1958, pp. 74-83.

[3] The standard deviation, σ, is solved from $\sigma = 1/(N-1)^{\frac{1}{2}}$ where N is the number of observations in the sample. See F. C. Mills, *Statistical Methods* (3rd ed.), 1955, p. 297 ff.

TABLE I

Autocorrelation Coefficients and Illustration of Method of Calculating Them: FRB, Index of Industrial Production (X), Seasonally Adjusted

A. Coefficients*

Time lag m	Coefficient r	m	r	m	r	m	r
1	.992	6	.682	11	.456	16	.419
2	.967	7	.775	12	.665	17	.416
3	.934	8	.784	13	.375	18	.323
4	.864	9	.557	14	.469		
5	.738	10	.537	15	.445		

* The number of observations, n, is defined by: n=84−m.

B. Illustration of Calculating Procedure

Time, t (1948)	Jan.	Feb.	Mar.	Apr.	May	June	July
X_t	104	103	[102]	102	104	104	105
X_{t-1}	—	104	103	[102]	102	104	104
X_{t-2}	—	—	104	103	[102]	102	104
•							
•							

As the numbers in the joined squares indicate, each row contains the original series, X_t, but shifted to the right one month for X_{t-1}, two months for X_{t-2}, and so on. The first lag autocorrelation coefficient is the simple correlation coefficient between series X_t and X_{t-1} as now aligned; the second lag, that between X_t and X_{t-2}; and so on.

It becomes clear that if two series exhibit this high autocorrelation, there will be a much greater likelihood of obtaining large values of the correlation coefficient between them than would prevail under the standard assumption of independent drawings. For, as the hypothetical series in Figure 1 suggest, over many time periods, series that are highly autocorrelated will tend to yield high intercorrelations even though essentially independent of each other over very long spans of time. Thus in periods III and V, series A and B are closely correlated, positively; in periods I, II and VI, negatively; only in period IV does there appear to be little or no correlation. It was from this important finding that G. U. Yule in his presidential address to the Royal Statistical Society proceeded to lay the groundwork for the modern critique of correlation among time series.[4] His work gave currency to the term "nonsense correlation," forcefully illustrated by his consideration of the high correlation (.9512) between the proportion of Church of England marriages to all marriages and the mortality rate per thousand population, 1866-1911, in England and Wales!

Unrelated time series, like those depicted, whose true correlation coefficient over a very large number of observations is zero will, nevertheless, tend to yield coefficients that, in samples of ordinary size, are biased towards large values (positive or negative). Another way of putting the same thing is to say that standard estimates of the variance of the distribution of sample coefficients are biased downward. One need only glance at Figure 1 to see that this is not merely the well-known loss of degrees of freedom but is a different matter, determined by the continuity properties of each series. The standard test, predicated upon distributions of correlation coefficients from unrelated series, is clearly inapplicable. Hence, both the method of estimating variance and the assumption about the shape of the distribution of sample values become in need of overhaul.

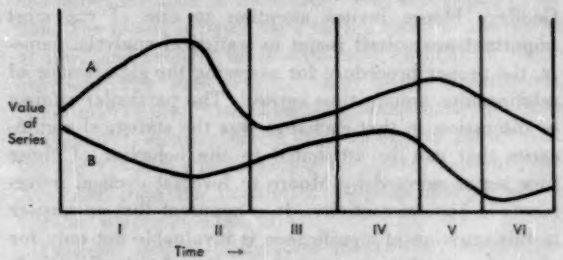

Fig. 1. Two hypothetical time series.

An approach to the solution of this problem came when statisticians began to study the properties of series that they had generated synthetically. These series resembled time series and since the processes used to generate them were known, so also were the expected sampling distributions of correlation coefficients between pairs of them. And with these distributions known, the probability of drawing coefficients within given size ranges could be definitely stated.[5] The kind of process used to create these "artificial" series is well worth noting; it may be represented by

$$X_t = aX_{t-1} + e_t$$

where X_t is the value of a series at a given time, t; X_{t-1} the value at a preceding time, t−1; e_t is a random number selected at time t; and a is a decimal coefficient. To avoid the creation of a trend, the random component, e_t, may be drawn from a universe of mean zero, i.e., numbers may be selected at random from the universe between, say, plus 50 and minus 50.[6]

[4] G. U. Yule, "Why Do We Sometimes Get Nonsense Correlations Between Time Series," *Journal of the Royal Statistical Society*, Vol. 89 (new series), 1926, pp. 1-64. A good discussion of this and related issues is contained in J. Marschak, "Economic Interdependence and Statistical Analysis," *Studies in Mathematical Economics and Econometrics* (Lange, McIntyre and Yntema, ed.), Chicago, 1942, pp. 135-150.

[5] M. S. Bartlett, "Some Aspects of the Time Correlation Problem in Regard to Tests of Significance," *Journal of the Royal Statistical Society*, Vol. 98, 1935, pp. 536 ff.

[6] The table at right shows the way in which values proceed from an assumed initial value of zero for X and a constant term, a, of one. There are two reasons for the attention I have given here to this process: first, it provides a remarkably useful device for demonstrating to students the likelihood of nonsense correlation. Thus, in using a series of this kind correlated with annual output of crude oil in the United States over two decades, I have usually got coefficients exceeding .91 (Of course, there is some luck involved here since the mean expected value of r is zero!) Second, there is little or no discussion of the problem of nonsense correlation in most elementary statistical texts. The best introductory discussion I know of is in Tuttle, *Elementary Business and Economic Statistics*, 1957, pp. 448ff.

t	1	2	3	4	5
e_t	5	12	−30	14	27
x	5	17	−13	1	28

While work with these series was highly suggestive of the sampling distributions that would characterize correlations from economic time series, a major gap remained. This was a gap in the knowledge of how accurately these series corresponded to real time series and therefore how closely the measures of reliability derived from the known processes of the former could be made to apply to the unknown processes of the latter. It was with the intention of filling this gap that Orcutt and James conducted empirical sampling experiments, calculating correlation coefficients between series of various lengths generated by a process resembling that described above; this process, moreover, had already been shown by Orcutt to have developed series that bore a statistically close resemblance to the 52 time series studied by Tinbergen.[7] The important conclusions offered by these investigators were that Bartlett's estimate of variance for the correlation coefficient might in many cases be used for economic series and that the shape of the distribution of sample coefficients was the same as that for non-related, random series corresponding to that variance.

A simple example will clarify this procedure. It is known that the variance of the distribution of correlation coefficients of non-related, random series is defined by $1/n - 1$, where n is the number of paired observations.[8] Now, if in a given case for economic time series we estimate the variance according to Bartlett's formula,[9] we may then substitute into the equation, $\text{var} = 1/n - 1$ and solve for n, the length of corresponding, random series. Knowing this value for n, we can use the ordinary tables of significance to test the value of the coefficient. Thus, suppose that two economic time series yield a correlation coefficient of .60 based, perhaps, on several hundred paired observations; the variance, computed from Bartlett's estimate that allows for autocorrelation, is found to be .10. Substituting this last value into $\text{var} = 1/n - 1$, we get $.10 = \frac{1}{n-1}$ and therefore $n = 11$. This means that the distribution of coefficients takes the form of the distribution of coefficents from a universe of non-related, random series of length eleven. An ordinary table of significant values of the coefficient at the one percent level shows that for random series of this length, the coefficient expected once in one hundred times is .735. Here, the value of the coefficient, .60, is shown to lack significance even though absolutely large and based (by assumption) upon several hundred observations, the reason being the high autocorrelation of the series which, in turn, produced a high variance.

To appreciate the practical importance of these results, we return the simple correlation of residential construction contracts and the FRB index of industrial production. The former of these series is known historically to have led the latter by about 6 months; thus it may be useful as a predictor of the latter. To determine how good a predictor, one may correlate the two series, *advancing* residential construction contracts forward six months (as explained in Part B of Table I). As mentioned earlier, the coefficient for 96 monthly observations, 1948 through 1955 inclusive is .830. According to standard formulae, the variance of the distribution of sample coefficients is approximately .01, the standard error .10. (Standard error $= \frac{1}{(n-1)^{1/2}}$). The coefficient, .830, differs from zero by more than eight standard errors and is, on standard testing assumptions, highly significant. Now, what qualification, if any, is needed when we allow for autocorrelation of these two time series? Industrial production and residential construction show first lag autocorrelations of .990 and .919 respectively. Using these values in conjunction with the Orcutt and James simplification of Bartlett's estimate we find the variance now to be .20, twenty times as large as before; the standard error is now about .45, four and one-half times as large. The coefficient is now less than two standard errors from zero and becomes just significant at the five percent level. A striking alteration in one's assessment of the association of these two series becomes necessary.

It is possible with this same procedure to shed light upon the central issue discussed by Moore and Valavanis with regard to Moore's leading statistical indicators. The issue, it will be recalled, was whether the time series selected by Moore as moving in advance of cyclical movements in general business activity do in fact exhibit a forecasting relationship that is statistically significant. To attempt a provisional answer to this question we need to do for the remaining seven indicators what we have just done for one, residential construction, that is, correlate each with industrial production after aligning it temporally with the index. For industrial production has historically displayed movements that are virtually coincident with the general business cycle.

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[7] G. H. Orcutt and S. F. James, "Testing the Significance of Correlation Between Times Series," *Biometrika*, Vol. XXXV, December, 1948, pp. 397-413. This work contains excellent references to much of the literature on these problems.

That the Tinbergen series might have been drawn from a universe of series generated by his process was established by Orcutt through comparisons of their correlograms. These comparisons involved annual data and it is possible that the use of monthly data would have suggested modification in the process.

[8] Cf. Orcutt and James, *op. cit.*, pp. 406-409. It may be emphasized here that the abbreviated discussion above is not designed as a substitute for the comprehensive discussion contained in the literature.

[9] Bartlett, *op. cit.* The approximation used is:

$$\text{var}_r = \frac{(1+r_1r_2)}{n(1-r_1r_2)} - \frac{2r_1r_2(1-r_1^2-r_2^2)}{n^2(1-r_1r_2)^2}$$

where r_1 and r_2 are the first lag autocorrelation coefficients of the series and n is the number of paired values. An additional simplification here introduced in all but the X_4 instance is the elimination of the term $r_1^2r_2^2$ which is of small order. For the variance of the coefficient of X_4, the term is large enough to warrant its retention.

Table 2 presents the results of this new testing. It is now clear that, upon assumptions that correspond more closely to the facts with respect to the behavior of time series, none of the indicators shows a correlation coefficient that is significant at the one percent level while two, X_2 and X_3 (commercial and residential construction contracts), become significant at the five percent level. (However, because the variances of correlations for three of the series are so great, the test of significance in these instances is subject to large error. See the first note to Table 2.) It is appropriate to suggest that students of business fluctuations may find these results useful in their application of Moore's work, provided they bear in mind that the results refer to one among many criteria that must be considered.

TABLE 2.
Relationship of Eight Leading Series to the Index of Industrial Production*

Leading Series†	Lead in Months	Correlation r, with FRB Index	Significant Values of r at 1%	at 5%
Commercial Contracts, X_2	5	.450	.53	.41
Residential Contracts, X_3	6	.830	.92	.81
Stock Prices, X_4	4	.870	.99	.97
New Incorporations, X_5	3	.586	.97	.91
Spot Prices, X_6	4	—.136	.99	.97
New Ordrs, X_7	6	.775	.95	.87
Average Hours, X_8	3	.591	.94	.85
Business Liabilities, X_9	6	.473	.99	.96

*All values, except the lead times, are based upon 96 monthly observations for the period January, 1948, through December, 1955. The leading series, of course, begin at various dates late in 1947 and terminate before December, 1955. For a detailed description of each series, see G. H. Moore, *Statistical Indicators of Cyclical Revivals and Recessions*, National Bureau of Economic Research, Occasional Paper No. 31, New York, 1950, and the references in note 2, above.

The variances for X_4, X_6, and X_9 are .69, .42, and .37, respectively; with values this large, the testing procedure must be recognized as unreliable.

†All series that exhibit seasonal variation have been corrected for it.

There are, of course, qualifications to most of the foregoing analysis of significance testing. While none of them, I think, overturns the main arguments that have been developed, two deserve special notice. In the first place, a correlation coefficient not differing significantly from zero is entirely consistent with a model that perfectly predicts the timing of cyclical turning points. For example, Figure 2 illustrates two hypothetical time series, one fluctuating cyclically, the other remaining constant except to display a peak at a definite time interval before the first series alters its direction of change. The leading series is seen to possess perfect accuracy in predicting turning points in the cyclical series although the two are virtually independent. In itself, then, the value of the coefficient provides no *necessary* condition for assessing

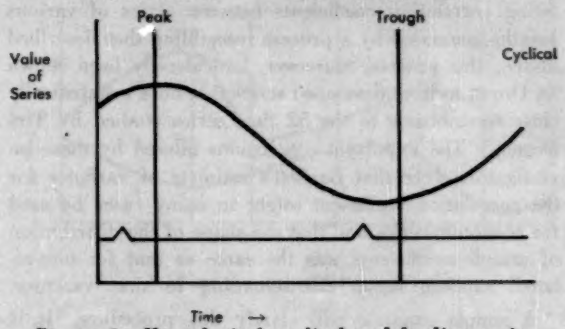

Figure 2. Hypothetical cyclical and leading series.

the merits of a system of this kind. (The leading series could, of course, have been depicted in many other ways, e. g., as random except for certain values, and have fulfilled the conditions of zero correlation and perfect predictive accuracy.) In spite of this, it seems most likely that if a series moves sympathetically before the turning points of another, it will move sympathetically at other times and thus yield significant correlation. Furthermore, although the change in testing assumptions that has been made above means that a closer correspondence has been achieved between the hypothetical population and the actual population of time series, a notable distinction remains. This distinction exists because the series studied were all drawn from the same period, a restriction that *almost surely leads to a bias that exaggerates significance.* This bias is due to the pervasive influence of the forces that produce cyclical fluctuations. Yet despite these qualifications and others that may occur to the reader, the problem of significance testing is moved to a context wherein more accurate answers are possible.

New Section on International Statistical Activities

A new section, which will be devoted to statistical activities in foreign countries, is being inaugurated in THE AMERICAN STATISTICIAN and will probably first appear in the December issue. Foreign statistical societies and other sources are being contacted for significant statistical news, including news of meetings, noteworthy applications of statistical methods, newly published books or studies in progress in the statistical field, new course programs, etc. It is hoped that such a section will promote the interests of the international community of statisticians and foster closer contacts among statisticians everywhere.

The editor of the new section will be Dr. Joan R. Rosenblatt, Statistical Engineering Laboratory, National Bureau of Standards. Foreign news items or communications regarding the new section should be addressed to:

Dr. Joan R. Rosenblatt
Foreign News Editor
American Statistical Association
1757 K Street, N.W., Washington 6, D. C.

SOME EXPERIENCE WITH ELECTRONIC COMPUTERS IN PROCESSING THE 1954 CENSUS OF MANUFACTURES*

Maxwell R. Conklin and Owen C. Gretton

U. S. Bureau of the Census

The use of electronic computers in the 1954 Economic Censuses made possible more extensive, refined and complex editing and tabulating techniques than had ever been attempted with equipment previously available. This paper is confined to experiences with such computers in processing the Census of Manufactures although Univac was equally important in the conduct of the Business Census. Beginning with a discussion of the advantages of the computer in determining the accuracy of the reports submitted in the Census, the imputation, disclosure analysis and tabulation programs are reviewed with a view toward those aspects needing improvement in the future. Some of the very real difficulties associated with the use of an electronic computer in a large non-repetitive statistical undertaking will be described later in this paper.

The Census of Manufactures is a multi-phase statistical undertaking of large magnitude. The basic input and output measures of manufacturing activity—employment, materials, fuels and electric energy used and products made—are obtained in considerable detail and in a related manner. Supplemental information of the structure of manufacturing is called for in the fields of inventories, capital expenditures, equipment in place, water use, and distribution of sales by type of customer. Reports are required from each manufacturing plant. The reporting effort is substantial for many companies, especially those with several plants in different industry lines. Although the Census inquiries are carefully designed to conform with record-keeping practices, the report form is necessarily long and susceptible to error on the part of the respondent, particularly the respondent whose records do not follow the usual pattern. Accordingly, the returns must be thoroughly screened at some stage of the processing for errors of significant size. The tabulations from the Census are varied and involve classifying each establishment several ways: by industry, by geographic location, by size, by type of ownership, by degree of product specialization, etc. The multiplicity of editing checks and tabulations needed for a present-day Census of Manufactures call for the imaginative utilization of the most advanced statistical tools and techniques available.

*Presented on September 12, 1957 at a session on Applications of Computers to Statistical Problems at the Annual Meeting of the American Statistical Association.

Testing Accuracy of Manufacturers Reports by UNIVAC

In isolating mistakes in reporting, chief reliance was placed on departures of individual reports from usual industry patterns. A number of relationships dealing with the plant as a whole and with products and materials were taken into account.

The ratio of cost of materials to value of shipments provides perhaps the most effective means of determining the validity of the two measures entering into the computation of value added by manufacture and of indicating the general accuracy of the respondent's report. In past Censuses, this ratio was computed clerically on a tabulation cell basis with considerable cost and, for individual establishments, the two figures had to be checked visually by technical staff members. In the 1954 Census, Univac computed the cost of materials—value of shipments ratio for every establishment. Then, for the reports falling within each of the Census standard employment size groups (i.e., 1-4, 5-9, 10-19 employees, etc.), Univac classified the returns according to class intervals of five percent in terms of the cost of materials—value of shipments ratio. The machine also computed the proportion of the industry—employment size class total of payrolls and value of shipments accounted for by establishments within each of the ratio intervals. An examination of these frequency distributions revealed suspect cells, particularly at the extremes, which upon a check of the report often resulted in a necessary correction of the data. At a quick glance, consistency or the lack of it between size class groupings could be easily spotted. The distributions also indicated whether there was a large modal group of establishments in the industry, or perhaps that the industry was bi-modal. Any unusual characteristics were described in the industry text accompanying the published tables.

Not only did Univac compute the cost of materials—value of shipments ratio for many more cells than would have been possible on conventional equipment and at considerably less cost but it computed them in the same program that provided the industry-size class aggregates. In addition, the computer afforded the analyst the following seven ratios by industry for each employee size class: Average annual earnings per employee (total payroll/total employment); Ratio of production workers

workers to total number of employees; Average production-worker man-hours per year; Average hourly earnings of production workers; Value added per employee; Ratio of total payroll to value of shipments; and Expenditures for new plant and equipment per employee. Previously, fewer of these ratios were available and then only at the summary industry level.

In addition to the ratios Univac provided on general statistics relating to employment, payrolls, value added by manufacture and the like, especially effective programs were written for the review of the product and materials tabulations. The machine computed unit values for each reported product line, selected the median of the first five observations as the median class in a predesignated set of twelve size intervals and proceeded to spread the respondents' value entries in accordance with those class intervals. The intervals had the following characteristics: (a) they approximated 10% from one interval to the next; (b) they all had boundaries that were in even units or halves or quarters of units; (c) they were equally applicable to any level of unit values, whether in cents or thousands of dollars and (d) the appropriate range was determined by the data themselves. The program printed out the identification numbers of schedules falling in the extreme end classes (a maximum of 10 at either extreme). The amount of imputation of missing quantities and values, disclosure symbol and corollary information and other data, such as the aggregate value of entries for which quantities were not imputed because of their large value, were also shown. That which was done for products was also performed for individual materials with slight modifications.

In the set of Univac programs written to cover the editing for reasonableness of entries on the Census schedules, upper and lower limits were established around the industry and geographic averages for previous years. Regression lines were drawn and modified on a judgment basis as the lines were extended to size classes not directly represented in the historical data or exhibiting random tendencies. As the reports were tested against these ranges, the limits were modified to reflect the current 1954 data in a manner designed to control the number of rejects and incidence of finding respondent errors. Each report was examined in terms of the basic ratios described earlier. Modifications of the ratios was introduced as appropriate in fields such as apparel jobbers and contractors which are characterized by virtually no production workers or purchased materials, respectively. On the product and materials side of the picture, unit values constituted the principal edit although variations were introduced to allow for the edit of supplemental columns of data such as production for use within the same establishment. A lesson for future Censuses is to be observed at this point. For what were thought to be reasons of convenience for the Univac work, the materials information was placed on a separate record from the product data in the Census. Because of the difficulty of writing a program comparing the two sets of records, cross-checks between products and materials were excluded with resulting disadvantage. However, considerable progress was made in developing new and imaginative checks in the machine. For example, a simple but effective ferreting out of industry coding errors was a search for certain codes that should not appear in establishments of small size (steel mills) or in certain geographic area (cane sugar in New England).

Use of UNIVAC in Imputation

Some reports do not contain answers to all questions or have answers that are obviously wrong. If the reports are individually significant, correct information is obtained from the respondent. If the reports are for very small concerns the unreported or incorrect data may be assumed to have the characteristics of data reported by others in the same industry so long as the proportion so imputed is not a large part of the total.

The imputation program of the 1954 Census of Manufactures would not have been possible without the electronic computer. The Univac took the limited number of key items on the more than 100,000 short forms in the Census and imputed detail identical with that reported by larger respondents on one of the approximately 200 standard forms. Although the volume of short forms was large, their effect on the published totals was very small (typically, about two percent). For short form reporters, as well as for some items reported by moderate-sized concerns on the longer forms, the machine examined the accuracy of the reported information, corrected it if it were outside acceptable tolerance ranges and re-edited the corrected data. It did all this on the basis of factors derived from 1953 Annual Survey of Manufactures data, taking into account a plant's industry classification, regional location, and employment size. The result was the saving of considerable money over previous Censuses and the avoidance of any need to set up two sets of statistics in the Census tables—one for statistics representing all establishments and another for statistics for plants reporting detailed data. The knowledge that the computer could be used in this way was an important factor in extending the use of the short forms to over twice that in the 1947 Census. Because of the ability of the machine to handle a great deal of historical data to serve as the imputation base, there was no impairment of the resulting statistics.

One of the reasons that the imputations could be made with a high degree of reliability was that they were usually based on related data actually reported by the respondent. Payrolls were estimated from the reported number of employees and, on other occasions, reported payrolls were used to derive estimated man-hours worked, based

on relationships between these items as tabulated in past Annual Surveys of Manufactures.

Estimating Reports for Delinquent Respondents

In addition to the use of imputation in editing, Univac was used effectively in the program of estimating reports for delinquent respondents by imputing complete reports from Bureau of Old Age and Survivors Insurance payroll data. Here again was an area for which Univac was ideally suited. As the time arrived for closing out for tabulation, there were a sizeable number of companies that had not yet returned their completed reports. Although the net effect of these on the statistical totals was small because of the very small size of the delinquents (all large delinquents had been followed up by Census field offices or by telephone from Washington), data for them had to be included for purposes of the establishment counts and for the accuracy of small county and city totals in the tables. The reports could be accurately estimated by the use of payroll data available by establishment from the Bureau of Old Age and Survivors Insurance records and sets of ratios of that statistic to the other establishment data on inventories, shipments, etc. These latter factors which were built into a reference tape for this program were varied by industry in accordance with earlier Census tabulations. The program of estimating some 20,000 small delinquents was performed by Univac at a fraction of the cost of doing it clerically or with conventional equipment and essentially on an error-free basis.

Use of Computer in Disclosure Analysis

The Census Bureau is required by law to use the reports it receives for statistical purposes only and to protect the individual respondent from the disclosure of his reported figures. The computer performed much of the analysis required for this purpose. It determined the number of companies in each cell and computed the proportion of the total accounted for by the two largest companies in the cell. The machine printed out one of a number of symbols, indicating that there was no disclosure in the cell, or if there was, designating the type of disclosure involved and showed the actual totals for the two largest companies together with their identification numbers. This technique greatly facilitated the selection of the optimum combination of cells by professional analysts working with the tabulation sheets. Considerable costly clerical time was saved, the principle of choosing smaller cells to use in protecting larger ones that were disclosures was implemented, and confidence was strengthened in the disclosure procedures essential to the taking of Census.

Advantages of Computer for Plant Specialization Statistics

In tabulating the results of the Census of Manufactures, the electronic computer enabled the Bureau to provide an answer to those data users who stressed the need for a more precise measurement of the relationship between the product output of an industry and the employment, payrolls, cost of materials and other establishment statistics reported by the same industry. The resulting table, Table 8 of the 1954 Census Industry Volume, showed a series of key statistics for establishments grouped according to their degree of specialization in the products of the 4-digit S.I.C. industry in which they were classified and in the products of their largest product class. The specialization ratios were computed for each establishment by Univac to the nearest percent in terms of (1) all primary products of the establishment to its total of primary plus secondary products and (2) the largest single product class of the establishment to its total of primary plus secondary products. A similar program of plant specialization data was abandoned in the 1947 Census because of a high incidence of errors in the clerical assignment of codes for principal product class and degree of specialization. The assignment of the codes in Univac for the 1954 Census overcame this problem and also greatly reduced the cost. In addition, doing the step clerically restricted the coding in 1947 to percentile ranges which was not the case when the computer was used. For convenience of presentation and to minimize the disclosure problem, the 1954 Census industry and product class data were provided in four specialization size ranges only: 90 percent or more, 75-89 percent, 50-74 percent and less than 50 percent. The Univac tapes, however, contain the actual ratios to the nearest percent and afford one of the numerous possibilities in the Census of special analyses and tabulations on a post-Census basis. As a matter of fact, a preliminary run of establishments arrayed by individual percents was made as a test of the validity of the proposed four class intervals before they were accepted as the tabulation frame. In keeping with Bureau policy, additional tabulations in terms of different frequency distributions could be undertaken for the cost of running the tapes and necessary disclosure analysis.

Opportunities for Research Opened Up by UNIVAC

Distributions of data by the machine, similar to that provided for the ratio of cost of materials to value of shipments, open all sorts of new avenues of exploration for the researcher. Among other things, the appropriateness of the S.I.C. industry classifications can be tested through such analyses at the industry level. It had been planned to run a similar distribution of man-hours and number of establishments according to class intervals of average hourly earnings in the tabulation of industry Table 2 (four-digit industry by State) but the tabulation program had been written by the time the decision to include the distribution had reached the Operations Division. This points up the importance both of an initial

determination of everything that is wanted because of difficulties in making major changes in Univac programs once they are written and of the need for close liaison between the subject matter analysts and the Univac programmers. This latter need is reflected in one school of thought that urges that the Univac programming be made a function of the subject division rather than be assigned administratively to the operating division.

Some of the analytical possibilities of the Census tabulations are being exploited by scholars working on monograph grants of the Social Science Research Council. The basic Univac record from the Census offers much in the way of special study and some of the researchers working at the Bureau come to the conclusion that the best means of maximizing their efforts is to become Univac programmers and write their own programs. The computer gives the researcher who understands the potentialities of the machine a seemingly limitless ability to manipulate establishments by the ratios mentioned. It opens up whole new fields of investigation. In one pass Univac can accomplish what would have required endless computations, sorts and retabulations on conventional equipment.

Given the necessary funds and resources in the way of Univac programmers, much can be done with the 1954 Census Univac tape records as they now exist. The extension of the plant specialization statistics to individual materials and fuels is being financed for the chemical and metalworking industries by the Business and Defense Services Administration for use in defense mobilization planning. Special tabulations are being done on a reimbursable basis for the Tennessee Valley Authority, Small Business Administration, and the New York Metropolitan Regional Study among others. Univac also played a significant role in enabling the Bureau to make the extensive tabulations of the market shares of large companies by industry and product group requested by the Senate Sub-Committee on Antitrust and Monopoly of the Judiciary Committee.

Desirable Improvements in Use of the Computer

The introduction of the electronic computer further lengthens the preparatory cycle for statistical processing. A very great premium is, therefore, placed on careful advance planning. To the extent that resources for preparation are not available or that a census for any other reason contains unanticipated difficulties, the electronic computer tends to magnify rather than to reduce the resulting problems.

The use of Univac in the 1954 Census went a long way in developing techniques of editing against previous year averages, of mechanical coding and of cross-tabulations, but it did not go far enough. The Bureau plans to go further in each of these fields in 1958. The electronic computer called for an entirely new kind of approach and thinking on the part of everyone concerned with planning and developing the Census. Failure to adjust to this to a certain degree resulted in an equivalent failure to realize the potentialities of the computer. It is important to have clearly in mind what you want to accomplish in the computer well in advance of the programming and tabulating. It should be noted that our failure to do this in the 1954 Census was largely attributable to an inordinately late start for the Census in the latter part of 1954 after Congress denied funds in 1953 as called for by the enabling legislation. As it was, the tardy start meant that Univac planning and programming had to proceed on a day-to-day basis. Dry runs preceding production runs often had to be foregone and testing in general was frequently inadequate. The "bugs" in the programs should have been eliminated by working with actual runs utilizing previous Census data. The staff should have had the opportunity to work on the test runs and check the results. Industry specialists did not receive sufficient background in Univac to come close to maximizing its use. In addition to a more orderly and better-timed approach to the 1958 Census, the fact that the Annual Survey of Manufacturers is now on a "shuttle" schedule with each year's data from 1954 through 1958 entered by the respondent on a single piece of paper should facilitate previous year comparisons in the computer on an individual establishment basis.

It takes time to adjust the many parts of a large statistical organization to the electronic computer and whereas the Census Bureau is better prepared for the forthcoming 1958 experience, it has no cause for overconfidence. The introduction of the new 1103's, with all their advantages in speed, memory storage, and ability to manipulate data will undoubtedly present a new and as yet unknown set of problems. The Bureau is resolved to discover as many of these in advance as possible and correct for them. The present heavy investment in training classes is a long step in that direction. There is one class for individuals who will write the actual programs, another for analysts who as members of either the subject or operating divisions will lay out the specifications for the programs and finally a so-called executives class for division chiefs, their assistants and branch chiefs who will be responsible for the over-all Census effort and for the basic processing and tabulating framework in which the computer will play a vital role.

Better System for Introduction Corrections Into the Records

One of the most pressing problems to be solved is the need for a better system for introducing corrections into the Univac record. This was a serious limitation in the 1954 Census and, at this late date, many of the necessary corrections, particularly in the product area, have not been carried to the Univac tapes. A rough magnitude

(Continued on back cover)

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QUESTIONS AND ANSWERS

Edited by ERNEST RUBIN
U. S. Department of Commerce and American University

Some Properties of the Median As An Average—Discussion by John H. Smith

Frequently we have been asked to discuss various characteristics of the principal statistical averages, especially the arithmetic mean and the median. It should be kept in mind that the choice of a particular statistical measure depends, apart from it having certain desirable mathematical properties, on the quantity and quality of the available data and on substantive essentials of the problem.

Almost all statistics textbooks contain a discussion of the median but the completeness of such discussions varies considerably; insufficient attention is given to a comparison of the sensitivity of the median with that of the arithmetic mean. Professor John H. Smith of the Department of Mathematics and Statistics of the American University, succinctly summarizes and analyzes the characteristics of the median, emphasizing some of the properties of this measure that appear to be least adequately treated in current textbook literature. I wish to thank Professor Smith for undertaking this discussion.

The median is relatively easy to define and to interpret, and when its properties are summarized, it stands out as one of the most useful of the common averages.

The median is the middle value of n values of X arranged in order of size. If n is even, it is the mean of the two middle values. For data grouped into a frequency distribution, the median is usually found by means of an interpolation formula based on even distribution of values of X within the median interval, an assumption represented graphically by the corresponding straight line segment of the ogive. For known types of uneven distribution within the median interval, better estimates of the ungrouped median can sometimes be obtained by making appropriate adjustments in either the ogive or the formula.

Descriptive Properties of the Median

The fact that the median is not greatly affected by variation in extreme values of X makes it especially useful when the data have features which are especially unfavorable to the determination of some of the other common averages. In some cases, such as personal or household incomes, it is often difficult to obtain even moderately accurate information about values at one or both extremes. In other cases, publishing difficulties, nondisclosure of confidential information, or lack of availability of data preclude any knowledge of extreme values except the direction of their deviations from the average. For some variables which are qualitative or difficult to measure, individuals can be ranked and the median can sometimes be found by measuring the median individual.

The median is invariant with respect to most ordinary (monotone) transformations. For example, the median of log X is the logarithm of the median of X.

The median of a set of measurements can not be found from the medians of two or more subgroups and the numbers of items in the subgroups. This disadvantage of the median should not be overemphasized, however, because it is usually possible to find a reasonably good weighted average of the subgroup medians.

The median is the value of X from which the sum or the mean of absolute deviations has its smallest value. When n is even, the same smallest value is found when deviations are measured from any value between the two middle values of X, a feature which complicates certain discussions for the case in which n is even.

The median of any set of non-negative numbers such as absolute deviations and their squares, cannot exceed twice their mean. Since the quartile deviation is the median of absolute deviations from the midquartile, this property of the median implies that the ratio of the quartile deviation to the mean deviation cannot exceed 2 and that the ratio of the quartile deviation to the standard deviation cannot exceed the square root of two. It is easy to find data in which the ratios Q.D./(M.D.) and Q.D./σ vary from zero to unity. The more unusual cases in which the ratios assume any values from unity up to, but not including, the limiting values can be found from a symmetrical distribution having three distinct values (such as the binomial distribution for n=2). As the relative frequency of the central value varies from zero to one-half, the ratios Q.D./(M.D.) and Q.D./σ increase from initial values of unity and they approach their limiting values of 2 and $\sqrt{2}$, respectively.

Confidence Intervals for the Median of the Universe

Confidence intervals for the unknown median can be constructed for any type of universe. Fortunately, these confidence intervals are relatively easy to construct and to justify. In each case, the limits of the interval are the extreme values of X in a group of k central observations in order of size. For example, the largest and the smallest values of X in a sample of three provide the limits of a 75 percent confidence interval for the unknown median of the universe. In justification of this statement, it can be shown that the probability of all three sample observations being less than the universe median is ⅛ (possibly less for a discrete universe) and that the probability of all three being greater than the median is also ⅛. Thus, the median is in the closed interval between the extreme values in 75 percent of all possible samples of three (*at least* 75 percent for a discrete universe). This type of reasoning can be extended

to any sample size and to intervals based on any number of central values in a sample array, thus justifying confidence intervals for the median whose limits are extreme values of a group of central observations. Exact degrees of confidence are provided in Tables of the Incomplete Beta Function, in various tables of binomial probabilities, and in special tables which are beginning to appear in statistics texts. Relatively easy approximations can be derived for sample sizes not covered by these tables.

Comparison of the Median with the Mean—Effects of Kurtosis

The sampling reliability of the median increases with increasing concentration of values of X near the median of the universe, and it is affected relatively little by changes in the nature of the distribution of extreme values of X in the universe, especially when the sample size is large. Thus, *in comparison with the mean*, the relative advantages of the median are greater when the universe has high concentration in the center and a small, but important, proportion of extreme deviations; that is, when the universe is leptokurtic and the measure of kurtosis is very large. The relative advantages of the mean over the median are greatest when the universe has low concentration, or even a gap, near the center and extreme deviations are negligible, or absent; that is, when the universe is platykurtic and the measure of kurtosis is fairly close to unity, its smallest possible value. In short, the relative advantages of the median over the mean increase as the kurtosis increases.

Effects of kurotsis on the relative advantages of the mean and the median can be illustrated by considering a sequence of symmetrical universes for which the measure of kurtosis increases indefinitely beginning with unity, its smallest value. This sequence proceeds through U-shaped distributions to the rectangular distribution, through platykurtic distributions with rounded modes to the normal distribution, and through leptokurtic distributions to the Cauchy distribution for which the measure of kurtosis does not exist. The playtkurtic distributions (both U-shaped and unimodal) are Beta type distributions and the leptokurtic distributions are like that of Student's t.

For the extreme form of the U-shaped universes, the median is worthless because its sampling distribution is exactly the same as that of the universe for any n, however large. Under the same conditions the mean is an excellent average, so that it is fair to state that the mean has its greatest relative advantages over the median in cases like this where the mean is satisfactory and the median is worthless. As the U-shaped curves approach the rectangle, the reliability of the median increases, and the relative advantages of the mean gradually decrease. For the rectangular universe another average, the mid-range, is a superefficient estimator which is far superior to either the mean or the median. It is important to emphasize, however, that the existence of another estimator superior to either is irrelevant so far as a comparison of the median with the mean is concerned. As the platykurtic distributions approach the normal distribution, the reliability of the median continues to increase, and the relative advantages of the mean over the median continue to decrease. Even for the normal universe the mean is still superior to the median. In fact, when the universe is normal, the mean is a sufficient maximum likelihood estimator, and it is well known that the standard error of the median is about 25 per cent greater than that of the mean. Since the mean is such an excellent estimator when the universe is normal, many have inferred (incorrectly) that the relative advantage of the mean over the median is greatest when the universe is normal. The foregoing argument shows that the relative advantages of the mean over the median are far greater for extremely platykurtic universes than for normal universes. In other words, it is important to emphasize that the relative advantages of one average over another increase (1) when the first becomes more reliable; (2) when the second becomes less reliable; (3) when the first becomes more reliable as the second becomes less reliable; and (4) when both become more reliable, but the first improves more than the second; or (5) when both become less reliable, but the second deteriorates more than the first.

Beginning with the normal curve, the increase in kurtosis continues to cause the reliability of the median to increase in comparison with that of the mean until the two averages are equally reliable for a distribution whose graph looks like a normal curve, but which has a larger measure of kurtosis. From this point on, the median is more reliable than the mean and the relative advantages of the median over the mean increase continuously. For the Cauchy distribution, a limiting form of leptokurtic distribution, the sampling distribution of the mean is exactly the same as the universe for any n, however large, and the mean becomes worthless. Under the same conditions, sample medians cluster more and more closely about the mean of the Cauchy universe in almost the same way that they do about the mean of a normal universe, provided only that the maximum ordinate of the frequency curves are the same for the two types of universes. It seems fair to conclude that the relative advantages of the median over the mean are greatest in cases like this where the median is a good average while the mean is worthless.

Investigation of Sensitivity to Special Features of Universe

The sampling properties of the median are relatively insensitive to any characteristic of the universe except its degree of concentration about the universe median. Since a similar statement is not true concerning the com-

(Continued on Page 41)

Program of the 118th Annual Meeting of the

American Statistical Association

Congress Hotel, Chicago, December 27-30, 1958

Combined with the program of the BIOMETRIC SOCIETY (ENAR)

Schedule of Meetings

Note: The program is as accurate as possible at the time this issue went to press. However, please remember that changes will occur in times as well as content before the meeting takes place. The version below is for information only; consult the final program for actual schedules.

SATURDAY, DECEMBER 27

10:30 A.M.-12:20 P.M.

Statistical Analysis of Historical Data
Business and Economic Statistics Section

Chairman:
EARL J. HAMILTON, University of Chicago

Papers:
"Statistical Samplings: An Application to Historical Data" by ERNEST RUBIN, Department of Commerce
"Income Change: An Adjustment for Extended Time Series" by LLOYD SAVILLE, Duke University
"Selected Statistical Tools Applied to Historical Data" by RONDO E. CAMERON, University of Wisconsin

Discussion:
EDWARD C. BUDD, Yale University

10:30 A.M.-12:20 P.M.

Training and Teaching Aids in Statistics
Section on Training

Chairman:
PAUL A. VATTER, Harvard University

Papers:
"Educational and Training Films in Statistics" by GRANT I. BUTTERBAUGH, University of Washington
"Some Suggested Aids to Teaching Statistics" by R. CLAY SPROWLS, University of California

Discussion:
J. PARKER BURSK, University of Pennsylvania

10:30 A.M.-12:20 P.M.

Recent Surveys of Factors Affecting Family Size
Social Statistics Section

Chairman:
DUDLEY KIRK, Population Council, Inc.

Papers:
"The Growth of American Families: Results of a National Survey" by PASCAL K. WHELPTON, Scripps Foundation; ARTHUR A. CAMPBELL, Scripps Foundation; and RONALD FREEDMAN, University of Michigan
"Interim Findings in the American Family Study" by PHILIP C. SAGI, Princeton University
"Medical Attitudes Toward Family Planning" by SYDNEY S. SPIVACK, Columbia University

Discussion:
(To be announced)

10:30 A.M.-12:20 P.M.

Unequal Subclass Numbers (Fixed and Random Models)
Biometrics Section—Section on Physical and Engineering Sciences—Biometric Society (ENAR)

Chairman:
HENRY L. LUCAS, North Carolina State College

Papers:
"Influence of Weighting Choices on Tests of Main Effects and Interactions" by J. A. NORTON, JR., Purdue University
"Level of Significance and Power of the Unweighted Means Test" by DAVID G. GOSSLEE, University of Connecticut

Discussion:
D. C. HURST, Virginia Polytechnic Institute

2:00-3:50 P.M.

How Consistently do Official Data Report Short-Run Changes in Manufacturing?
Business and Economic Statistics Section

Chairman:
HAROLD BARNETT, Resources for the Future, Inc.

Papers:
"Production Trends" by CLAYTON GEHMAN, Federal Reserve Board
"Investment Trends" by LARRY BRIDGE, Department of Commerce

"Employment Trends" by SEYMOUR L. WOLFBEIN, Bureau of Labor Statistics

Discussion:
(To be announced)

2:00-3:50 P.M.

Measurement of Radioactivity
Biometrics Section—Biometric Society (ENAR)

Chairman:
A. E. BRANDT, University of Florida

Papers:
"Estimation when the Regression Function is a Sum of Exponentials" by A. M. DUTTON, University of Rochester; and S. LEE CRUMP, University of Rochester

"Estimation from Observations Having Specified but Unassigned Expectations in a Radiation Experiment with *Paramecium Aurelia*" by ALLYN W. KIMBALL and R. F. KIMBALL, Oak Ridge National Laboratory

Discussion:
JOSEPH BERKSON, Mayo Clinic

2:00-3:50 P.M.

Canadian and United States Economic Statistics — A Comparative Analysis
Business and Economic Statistics Section

Chairman:
WALTER E. DUFFETT, Dominion Bureau of Statistics

Papers:
"Index of Industrial Production" by V. R. BERLINGUETTE, Dominion Bureau of Statistics

"Quarterly Deflated National Accounts" by R. B. CROZIER, Dominion Bureau of Statistics

"Quarterly Capital Formation" by D. H. JONES, Dominion Bureau of Statistics

Discussion:
(To be announced)

2:00-3:50 P.M.

Statistical Inference, Etc.
Section on Physical and Engineering Sciences

Chairman:
(To be announced)

Papers:
"Minimum Bias Estimation" by WILLIAM J. HALL, University of North Carolina

"Multiple Regression Involving Continuous Processes" by IRWIN MILLER, U. S. Steel Corp.

"Confidence Limits for the Expectation of a Poisson Variable" by NILAN NORRIS, Hunter College

"On Non-Parametric Statistics" by MILTON SOBEL, Bell Telephone Laboratories

4:00-5:50 P.M.

Adequacy of Monetary and Financial Statistics for Business Cycle and Money Market Analysis
Business and Economic Statistics Section, joint with American Economic Association

Chairman:
ROLAND I. ROBINSON, Federal Reserve Board

Papers:
(To be announced) by WESLEY LINDOW, Irving Trust Company

(Second speaker to be announced)

Discussion:
IRA SCOTT, Columbia University

ROBERT SOLOMON, Federal Reserve Board

FRANK E. MORRIS, Investment Bankers Association of America

4:00-5:50 P.M.

Adapting Census Procedures to Meet Today's Needs
Social Statistics Section

Chairman:
A. ROSS ECKLER, Bureau of the Census

Papers:
"Teaming Up Censuses and Samples" by FREDERICK F. STEPHAN, Princeton University

"Meeting Present Day Needs for Census Data in Agriculture" by ARNOLD J. KING, National Analysts, Inc.

"Procedures for the 1960 Censuses" by MORRIS H. HANSEN, Bureau of the Census

Discussion:
WILLIAM G. MADOW, Stanford Research Institute

4:00-5:50 P.M.

Life and Reliability Testing
Section on Physical and Engineering Sciences

Chairman:
(To be announced)

Papers:
"Typifying Life Behavior from Sample Test Data" by E. BIANCO, General Electric Company

"Estimation of an Average Life Parameter from a Sample from Mixed Populations" by LEO KATZ, Michigan State University

"Early Failures in Life Testing" by RUPERT MILLER, JR., University of California, Berkeley

"Simplified Estimators for the Normal Distribution when Samples are Singly Censored or Truncated" by A. C. COHEN, JR., University of Georgia

"Some Aspects of Reliability" by WILLIAM MADOW, Stanford University

"Factorial Experiments in Life Testing" by MARVIN ZELEN, National Bureau of Standards

4:00-5:50 P.M.

Biometric Society (ENAR) — Regional Advisory Board Meeting

6:00 P.M.—Dinner

Meeting of Board of Directors and Council, American Statistical Association

8:00-10:00 P.M.

Statistical Guides to Non-Inflationary Wage Bargaining

Business and Economic Statistics Section

Chairman:

JAMES T. O'CONNELL, U. S. Department of Labor

Papers:

"The Public Policy Framework" by GEORGE SCHULTZ, University of Chicago

"Statistics for Collective Bargaining" by EWAN CLAGUE, U. S. Department of Labor

"Economic Considerations in Wage Determination" by JULES BACKMAN, New York University

Discussion:

NAT GOLDFINGER, AFL-CIO

8:00-10:00 P.M.

Smoking and Cancer

Social Statistics Section—Biometrics Section

Chairman:

THOMAS PARRAN, Avalon Foundation

Paper:

"The National Institutes of Health Study of Smoking and Cancer" by HAROLD F. DORN, National Institutes of Health

Discussion:

CARL E. HOPKINS, University of Oregon Medical School

SUNDAY, DECEMBER 28

8:00 A.M.—Breakfast

Meeting of Chapter Presidents and Secretaries and District Representatives

American Statistical Association

10:30 A.M.-12:20 P.M.

Methodological Problems in the Collection of Statistics of Research and Development Costs and Manpower

Business and Economic Statistics Section, joint with American Economic Association

Chairman:

JACOB PERLMAN, National Science Foundation

Papers:

"Definitions, Concepts, and Interpretations Used in Research and Development Statistics" by WILLIS H. SHAPLEY, Bureau of the Budget

"Development of Statistics Relating to Research and Development Activities in Private Industry" by KENNETH P. SANOW, National Science Foundation

"A National Accounting System for Measuring the Inter-sectoral Flow of Research and Development" by HERBERT STRINER, Johns Hopkins University

Discussion:

GEORGE T. MCCOLM, National Research Council, Canada

DOUGLAS GREENWALD, McGraw-Hill Publishing Co.

HELEN WOOD, Bureau of Labor Statistics

KATHRYN S. ARNOW, National Science Foundation

10:30 A.M.-12:20 P.M.

Statistical Studies of the 1957-58 Recession

Business and Economic Statistics Section, joint with American Economic Association

Chairman:

GEOFFREY H. MOORE, National Bureau of Economic Research

Papers:

"An Extension of the Council of Economic Advisors' Statistical Intelligence System for the 1957-58 Recession" by JULIUS SHISKIN, Bureau of the Census

"Rates of Change and Cyclical Amplitudes" by PAO LUN CHENG, University of Massachusetts and LEONARD LEMPERT, Statistical Indicators Associates

Discussion:

JOSEPH A. PECHMAN, Committee for Economic Development

DONALD J. DALY, Department of Trade and Commerce, Canada

10:30 A.M.-12:20 P.M.

Engineering Statistics

Section on Physical and Engineering Sciences

Chairman:

(To be announced)

Papers:

"Operational Thinking in Management" by BOYD LADD, Southwest Research Institute

"Inequalities for Stochastic Linear Programming Problems" by ALBERT MADANSKY, Rand Corporation

"Use of Stepwise and Iterative Computer Procedures in Statistical Estimation" by MERVIN MULLER, Princeton University

"Decisions on Lot Disposition from Maximum and Minimum Sample Values" by R. D. SUMMERS, Bendix Aviation Corp.

10:30 A.M.-12:20 P.M.

Statistical Seminars in Medical Research

Biometric Society (ENAR)—Biometrics Section—Section on Training

Chairman:

B. G. GREENBERG, University of North Carolina

Panel Discussion:

COLIN WHITE, Yale University

DONALD MAINLAND, New York Univ. Bellevue Medical Center

CARL HOPKINS, University of Oregon Medical School

S. M. FREE, Smith, Kline & French Laboratories

G. BADGER, Western Reserve University

THOMAS CHALMERS, Harvard University and Lemuel Shattuck Hospital

HENRIETTA HERBOLSHEIMER, University of Chicago

R. G. HOFFMANN (Recorder), University of Florida

12:30 P.M.—Luncheon

The Economic Outlook

American Statistical Association, joint with American Economic Association and American Finance Association

Chairman:

MARTIN R. GAINSBRUGH, National Industrial Conference Board

Speakers:

GABRIEL S. HAUGE, Manufacturers Trust Company

EZRA SOLOMON, University of Chicago

2:30-3:50 P.M.

Labor, Statistics, and the Cost of Living

Social Statistics Section—Business and Economic Statistics Section

Chairman:

THEODORE W. SCHULTZ, University of Chicago

Papers:

"Factors in the Rising Cost of Living" by ARYNESS JOY WICKENS, U. S. Department of Labor

"Is Labor The Culprit?" by PETER HENLE, AFL-CIO

"Is This a New Type Inflation?" by GEORGE P. HITCHINGS, Ford Motor Company

Discussion:

(To be announced)

2:30-3:50 P.M.

Quality Changes and Index Numbers

Business and Economic Statistics Section

Chairman:

FRANK HANNA, Duke University

Papers:

"Manufacturing Indexes and Quality Changes" by FRANK DE LEEUW, Federal Reserve Board

"The Use of the Annual Survey of Manufactures in an Annual Index of Production" by MORRIS R. GOLDMAN, Bureau of the Census

Discussion:

ETHEL HOOVER, Bureau of Labor Statistics

EDWARD F. DENISON, Committee for Economic Development

2:30-3:50 P.M.

Design of Experiments

Section on Physical and Engineering Sciences—Biometrics Section—Biometric Society (ENAR)

Chairman:

J. D. HROMI, U. S. Steel Corp.

Papers:

"Some Recent Work on Mixed Fractional Factorial Designs" by W. S. CONNOR, National Bureau of Standards

"The Power of the Analysis of Variance Test Under Constrained Randomization" by H. C. SWEENEY, Atlantic Refining Company

"The Role of Treatment Error in Comparative Experiments" by G. ZYSKIND and O. KEMPTHORNE, Iowa State College

"Measurements Made by Matching with Known Standards" by W. J. YOUDEN, National Bureau of Standards

2:30-3:50 P.M.

Decision Theory, Its Teaching in Basic Statistics Courses and Applications

Section on Training, joint with Econometric Society

Chairman:

JOHN E. FREUND, Arizona State University

Papers:

"Decision Theory in Elementary Statistics" by HERMAN CHERNOFF, Stanford University

"Game Theory in Advertising" by LAWRENCE FRIEDMAN, M & M Candies

Discussion:

WILLIAM G. MADOW, Stanford Research Institute

DAVID L. WALLACE, University of Chicago

2:30-3:50 P.M.

Contributed Papers

Biometrics Section—Biometric Society (ENAR)

Chairman:

V. L. ANDERSON, Purdue University

Papers:

"Contributions of Multihospital Data to Standardization and Reliability of Laboratory Determinations" by C. S. WOODSON, Commission on Professional and Hospital Activities, Inc.

"Statistical Systems for Research in Clinical Psychiatry" by J. B. CHASSEN, St. Elizabeths Hospital

"Utilization of Chromosomes in Quantitative Inheritance" by H. E. MCKEAN, Purdue University

"Statistical Interpretation of Experiments in the Physiology of Reproduction in Dairy Cattle" by J. P. GEORGE, University of Tennessee

"Optimal Spacing in Regression Analysis" by H. A. DAVID and BEVERLY ARENS, Virginia Polytechnic Institute

"Significance Tests in Paired Comparisons" by T. H. STARKS and H. A. DAVID, Virginia Polytechnic Institute

4:00-5:50 P.M.

Adequacy of the Statistical Foundation for Monetary Policy Formation

Business and Economic Statistics Section, joint with American Economic Association

Chairman:

GEORGE GARVY, Federal Reserve Bank of New York

Papers:

(To be announced) by J. J. POLAK, International Monetary Fund

(To be announced) by RALPH A. YOUNG, Federal Reserve Board

Discussion:

WARREN SMITH, University of Michigan

FRANK M. TAMAGNA, American University

CLARK WARBURTON, Federal Deposit Insurance Corporation

4:00-5:50 P.M.

Economics and Population Change

Social Statistics Section

Chairman:

SIMON KUZNETS, Johns Hopkins University

Papers:

"Internal Migration and Economic Opportunity" by DOROTHY SWAINE THOMAS, University of Pennsylvania

"Population Growth and Economic Development in the U.S.S.R." by WARREN W. EASON, Princeton University

"Business and Babies: The Relations Between Short-Run Economic Fluctuations and the Birth Rate" by DUDLEY KIRK, The Population Council, Inc.

Discussion:

(To be announced)

4:00-5:50 P.M.

Use of Computers on Linear Programming and Response Surface Problems

Biometrics Section—Section on Physical and Engineering Sciences—Biometric Society (ENAR)

Chairman:

R. H. GILLESPIE

Papers:

(To be announced) by H. O. HARTLEY, Iowa State College

(To be announced) by G. E. P. BOX, Princeton University

Discussion:

G. R. SHERMAN, Purdue University

D. R. JARRELL, United Gas Company

8:00-10:00 P.M.

Is There A Shortage of Scientific Manpower?

American Statistical Association

Chairman:

STUART A. RICE, Surveys and Research Corporation

Papers:

"The Economics of the Question" by DAVID M. BLANK, Columbia Broadcasting Corporation

"The Problem as Faced by Federal Agencies" by THOMAS MILLS, National Science Foundation

"The Problem from the Standpoint of the Scientist and Technician" by MERRIAM H. TRYTTEN, National Research Council

"On Obtaining an Answer to the Question" by PHILIP M. HAUSER, University of Chicago

Discussion:

(To be announced)

MONDAY, DECEMBER 29

8:00 A.M.—Breakfast

Business and Economic Statistics Section — Business Meeting

8 A.M.—Breakfast

Social Statistics Section—Business Meeting

8:30-10:20 A.M.

Statistics in Research Design

Section on Training

Chairman:

LESLIE KISH, University of Michigan

Papers:

"Experiments Versus Surveys" by OSCAR KEMPTHORNE, Iowa State College

"Experiments, Surveys and Observations" by JEROME CORNFIELD, Johns Hopkins University

"The Role of the Statistical Consultant" by W. EDWARDS DEMING, New York University and Washington, D. C.

Discussion:

HARRY V. ROBERTS, University of Chicago

MARTIN B. WILK, Bell Telephone Laboratories

8:30-10:20 A.M.

Cardiac Problems

Biometric Section—Biometric Society (ENAR)

Chairman:

M. F. HALL, New Jersey State Dept. of Health

Papers:

"Some Methodological Problems in Long-Term Studies of Cardiovascular Disease" by TAVIA GORDON, National Institutes of Health

"The Measurement of Blood Pressure Reactivity in Children" by R. REMINGTON, University of Michigan

"Problems of Diagnosis and Classification in Cardiovascular Disease Mortality Statistics" by IWAO MORIYAMA, National Office of Vital Statistics

Discussion:

F. STEPHAN, Princeton University

D. THOMPSON, University of Pittsburgh

10:30 A.M.—12:20 P.M.

How to Appraise Quantitatively the Effects of Government Economic Policy

Business and Economic Statistics Section, joint with American Economic Association

Chairman:

KENNETH B. WILLIAMS, Federal Reserve Board

Papers:

"Expenditures and Taxes" by GERHARD COLM, National Planning Association

"Loan Insurance and Guarantee Programs" by GEORGE F. BREAK, University of California, Berkeley

"Problems in the Quantitative Appraisal of the Influence of Government Programs on Prices" by JAMES KNOWLES, Joint Economic Committee Staff

Discussion:

JOHN M. CULBERTSON, University of Wisconsin

CHARLES D. STEWART, U. S. Department of Labor

10:30 A.M.-12:20 P.M.

Life and Reliability Testing

Section on Physical and Engineering Sciences

Chairman:

(To be announced)

Papers:

"Reliability Program for an Electronic Reconnaisance Set" by JULIAN EDELMAN, Loral Electronics Corp.

"Weibull Analysis and Synthesis of Assembly and Component Reliability" by LEONARD S. JOHNSON, General Motors Corp.

"A Statistical Model for Evaluating the Effectiveness of Safety Systems for Plants Manufacturing Hazardous Products" by LOUIS B. KAHN, Shell Development Co.

"Reliability Functionalism" by JOHN TUGGLE, Westinghouse Electric Co. and LEONARD RADO

"Optimum Maintenance Policies" by JOHN A. ZOELLNER, General Electric Co.

10:30 A.M.-12:20 P.M.

Training of Foreign Statisticians

Section on Training

Chairman:

CALVERT L. DEDRICK, Bureau of the Census

Papers:

"Some Training Needs of Foreign Statisticians" by JOHN W. MORSE, Hobart & William Smith College

"International Training for the 1960 World Census Program" by WILLIAM R. LEONARD, United Nations

"Training of Foreign Statisticians in Governmental Agencies" by THOMAS F. MOSIMANN, Bureau of Labor Statistics

Discussion:

JACOB PERLMAN, National Science Foundation

TULO H. MONTENEGRO, InterAmerican Statistical Institute

WALLER WYNNE, JR., Bureau of the Census

10:30 A.M.-12:20 P.M.

Recent Surveys in Health

Social Statistics Section

Chairman:

THEODORE D. WOOLSEY, Department of Health, Education and Welfare

Papers:

"Survey Methods and Medical Care—Strategy and Tactics of a Research Program" by ODIN W. ANDERSON, Health Information Foundation

"United States National Health Survey" by WALT R. SIMMONS, National Health Survey Program

"What Americans Think About Their Hospital and Medical Care" by JACOB J. FELDMAN, University of Chicago

Discussion:

(To be announced)

10:30 A.M.-12:20 P.M.

Biometrics Section—Business Meeting

2:00-3:50 P.M.

Estimating Federal Government Receipts and Expenditures

American Statistical Association joint with American Economic Association

Chairman:

LAWRENCE SELTZER, Wayne University

Papers:

"Receipts" by THOMAS SMITH, U.S. Treasury

"Expenditures" by SAM COHEN, Bureau of the Budget

2:00-3:50 P.M.

Ceremonial Meeting in Honor of Harold F. Dodge

Section on Physical and Engineering Sciences

Chairman:

W. EDWARDS DEMING, New York University and Washington, D. C.

Speaker:

"Some ASTM Publications of Interest to Statisticians" by HAROLD F. DODGE

2:00-3:50 P.M.

Contributed Papers

Social Statistics Section

Chairman:
(To be announced)

Papers:
"Negative Skewness and its Significance in Relation to Distributions of Performance Ratings of Civil Service Employees" by JAMES P. GEORGE, University of Tennessee

"Definition of Population Clusters and the Contiguity Ratio" by JAMES M. BESHERS, Purdue University

"A Suggested Method for the Delimitation of Population Clusters" by ARTHUR LOEBEN, University of Pennsylvania

"Heaping of Ages in Relation to the Number System" by STANLEY TURNER, University of Pennsylvania

2:00-5:50 P.M.

Census Tract Conference
American Statistical Association

Chairman:
HOWARD WHIPPLE GREEN, Cleveland Health Council

Papers:
"Theories and Methods of Differentiating Urban Social and Demographic Areas" by CALVIN F. SCHMID and SANTO F. CAMILLERI, University of Washington; EARLE H. MACCANNELL, San Diego State College; MAURICE D. VAN ARSDOL, University of Southern California

"Land Use Inventory in Philadelphia" by HARLIN G. LOOMER, Philadelphia City Planning Commission

"Building a Street Index for the Outlying Areas" by ALBERT MOELLMANN, The Detroit News

"Census Tract Plans for the 1960 Census" by HOWARD G. BRUNSMAN, FRANK S. KRISTOF, C. E. BATSCHELET, and ROBERT C. KLOVE, Bureau of the Census

Discussion Period

2:00-3:50 P.M.

Section on Training—Business Meeting

2:00-3:50 P.M.

Biometric Society (ENAR)—Business Meeting

4:00-5:50 P.M.

Significance of Postwar Productivity Trends
Business and Economic Statistics Section

Chairman:
LEON GREENBERG, Bureau of Labor Statistics

Papers:
"Implications of Postwar Productivity Trends in the U. S." by JOHN W. KENDRICK, George Washington University

"Implications of International Postwar Productivity Trends" by MARVIN FRANKEL, University of Illinois

Discussion:
GEORGE H. HAGEDORN, National Association of Manufacturers

NAT GOLDFINGER, AFL-CIO

PAUL FISCHER, International Cooperation Administration

4:00-5:50 P.M.

Research Tools of the Social Scientist
Social Statistics Section—Section on Training

Chairman:
WILLIAM HODGKINSON, JR., American Telephone & Telegraph Co.

Papers:
"Purposes of Scaling Techniques and Choices of Metrics" by ROBERT F. ABELSON, Yale University

"A New Methodology When Equations Outnumber Unknowns" by THOMAS N. E. GREVILLE, Social Security Administration

"Methods of Measuring Differences in Social Class" by THEODORE R. ANDERSON, Yale University

Discussion:
WILLIAM G. MADOW, Stanford Research Institute

4:00-5:50 P.M.

Regional Statistics
Business and Economic Statistics Section

Chairman:
WILLARD THORP, Amherst College

Papers:
"Projecting Local Government Expenditures" by WERNER Z. HIRSCH, Washington University

"The Pattern of Local Government Finances in Metropolitan Areas" by SEYMOUR SACKS, Cleveland Metropolitan Services Commission

Discussion:
ROBERT FERBER, University of Illinois

WALTER HELLER, University of Minnesota

HOWARD G. SCHALLER, Tulane University

4:00-5:50 P.M.

Section on Physical and Engineering Sciences—Business Meeting

4:00-5:50 P.M.

Meeting of Experiment Station Statisticians

Chairman:
HENRY TUCKER, University of Arizona

8:00-10:00 P.M.

Presidential Address—Walter E. Hoadley, Jr., Armstrong Cork Co.
American Statistical Association

10:00 P.M.

Informal Party
American Statistical Association and Biometric Society (ENAR)

TUESDAY, DECEMBER 30

8:30-10:20 A.M.

Structure, Uses and Inadequacies of the Official Price Deflators

Business and Economic Statistics Section, joint with American Economic Association

Chairman:

LOUIS H. BEAN, Washington, D. C.

Papers:

"B.L.S. Indexes Used in Deflating the Segments of National Product and Industry Aggregates" by H. E. RILEY, Bureau of Labor Statistics

"Department of Commerce Use of Deflators in Their Work" by CHARLES SCHWARTZ, Department of Commerce

Discussion:

LOUIS WEINER, Federal Reserve Board

B. SANDERS, Public Health Service

8:30-10:20 A.M.

Planning the 1960 Censuses to Meet National and Local Needs

Social Statistics Section

Chairman:

ROBERT W. BURGESS, Bureau of the Census

Papers:

"What Will the 1960 Censuses Do?" by CONRAD TAEUBER, Bureau of the Census

"New Subjects and New Emphasis in the Housing Census" by WAYNE F. DAUGHERTY, Bureau of the Census

"What is New in our Eighteenth Decennial Census of the Population?" by HENRY S. SHRYOCK, JR., Bureau of the Census

Discussion:

J. T. MARSHALL, Dominion Bureau of Statistics

8:30-10:20 A.M.

Desiderata for the Basic Course in Economics and Business Statistics

Section on Training—Business and Economic Statistics Section

Chairman:

RUTLEDGE VINING, University of Virginia

Papers:

"On the Content of the First Course in Statistics for Majors in Economics and Business Administration" by W. ALLEN WALLIS, University of Chicago

"What a Business School Dean Expects in the Teaching of Statistics" by MAURICE W. LEE, University of North Carolina

"Recommendations by the Joint Committee on Quantitiative Methods of the University of California" by GEORGE F. BREAK, University of California

Discussion:

(Paper by Wallis) JOHN E. FREUND, Arizona State University

(Paper by Lee) G. LELAND BACH, Carnegie Institute of Technology

(Paper by Break) MILLARD HASTAY, State College of Washington

8:30-10:20 A.M.

Design of Experiments

Section on Physical and Engineering Sciences—Biometrics Section—Biometric Society (ENAR)

Chairman:

I. W. BURR, Purdue University

Papers:

"Comparison of Designs for Exploration of Response Relationships" by LEROY FOLKS, Texas Instruments Co.

"Randomization and Least Squares Estimation" by MERVIN MULLER and G. E. P. BOX, Princeton University

"Some Observations on Random Balance Experimentation" by M. WILK and G. LEVENBACH, Bell Telephone Laboratories

10:30 A.M.-12:20 P.M.

Use of Computers and Mechanical Equipment in Statistics

American Statistical Association

Chairman:

R. J. NELSON, Case Institute of Technology

Papers:

(To be announced) by MORRIS HANSEN, Bureau of the Census

(To be announced) by J. W. TUKEY, Princeton University

Discussion:

FRED LEONE, Case Institute of Technology

JACK MOSHMAN, Corporation for Economic and Industrial Research

M. E. TERRY, Bell Telephone Laboratories

10:30 A.M.-12:20 P.M.

Response Surfaces

Biometrics Section—Section on Physical and Engineering Sciences—Biometric Society (ENAR)

Chairman:

C. E. MARSHALL, Oklahoma State University

Papers:

(To be announced) by D. W. BEHNKEN, Princeton University

(To be announced) by E. K. WOLFE, Biological Warfare Labs.

Discussion:

G. E. P. BOX, Princeton University

10:30 A.M.-12:20 P.M.

Tranquilizing Drugs—What is Being Learned
Social Statistics Section

Chairman:
MORTON KRAMER, National Institute of Mental Health

Papers:
"The Social Effects of Tranquilizing Drugs" by DEAN J. CLYDE, National Institute of Mental Health

"Community Adjustment of Former Mental Patients and Needed Steps for Their Assistance" by ELSA B. KRIS, New York State Department of Mental Hygiene

"What the Tranquilizing Drugs are Doing to the Population in Mental Hospitals" by ROBERT E. PATTON, New York State Department of Mental Hygiene

Discussion:
(To be announced)

2:00-3:50 P.M.

Recent Developments in Operations Research
Business and Economic Statistics Section

Chairman:
DAVID C. MELNICOFF, Pennsylvania Railroad

Papers:
"The Role of the Business Analyst in Operations Research" by MARTIN SHUBIK, General Electric Company

"Programming" by MAURICE SASIENI, Case Institute of Technology

Discussion:
OLIVER HAMILTON, Budd Company

2:00-3:50 P.M.

Multivariate Analysis
Biometrics Section—Section on Physical and Engineering Sciences—Biometric Society (ENAR)

Chairman:
R. D. G. STEEL, University of Wisconsin

Papers:
"Principal Components in Serially Correlated Systems" by E. K. HARRIS and G. P. WILLIAMS, Dept. of Health, Education and Welfare

"The Use of Some Non-Parametric Generalization of the Analysis of Variance in Market Research" by H. SMITH, JR., Procter and Gamble Company

"The Application of Multivariate Analysis of Variance to Chemical Process Problems" by R. GNANADESIKAN, Procter and Gamble Company

"Some Interpretations in the Analysis of Univariate and Multivariate Transformed Data" by R. E. BARGMANN, Virginia Polytechnic Institute

2:00-3:50 P.M.

Measuring Industrial and Population Growth: Tools for Marketing and Small Area Research
Social Statistics Section

Chairman:
EVERETT S. LEE, University of Pennsylvania

Papers:
"Military Statistics in Relation to Population Studies" by JACOB S. SIEGEL and MEYER ZITTER, Bureau of the Census

"A Method of Projecting the Number of Households in Small Areas" by WILLIAM HODGKINSON, JR., American Telephone and Telegraph Company

"Effectiveness of our Tools for Estimating Population Change in Small Areas" by CARL M. FRISEN, California Department of Finance

Discussion:
(To be announced)

2:00-3:50 P.M.

Contributed Papers
Business and Economic Statistics Section

Chairman:
ALBERT T. SOMMERS, National Industrial Conference Board

Papers: (To be announced)

Future Annual Meetings of the Association are as follows:

Year	*Place*	*Headquarters*	*Dates*
1958	**CHICAGO, ILLINOIS**	**CONGRESS HOTEL**	**DECEMBER 27-30**
1959	**WASHINGTON, D. C.**	**SHOREHAM HOTEL**	**DECEMBER 27-30**
1960	**PALO ALTO, CALIF.**	**STANFORD UNIVERSITY**	**LATE AUGUST**
1961	**NEW YORK CITY**	**ROOSEVELT HOTEL**	**DECEMBER 27-30**

THE PRESIDENT'S COLUMN—CONTINUED FROM PAGE ONE

future. The ASA Board and Council have given their approval to this project.

It has been a real pleasure personally to get better acquainted this year with the officials of the ASQC and other professional societies with interests related to those of the ASA. I have been struck with the similarity of the topics commonly under discussion in many of these professional groups—e.g., publications, "splintering" sub-groups, membership needs for "refresher" training, and finances. The latter subject—finances—seems to undergird all others since there is no end to the services which can be rendered to members, but a definite limitation on funds available.

My introduction to the national ASA organization was in the years immediately following the war, and coincided with a period of ASA financial stringency and crisis. The 1945 ASA budget was roughly $25,000 (with a membership of 3,480). A substantial deficit in 1948 with little or no financial reserve led to a reduction in the national office personnel from a high of thirteen full and part-time employees to five, the size of the current staff. Dues were also increased from six to the present eight dollars annually in 1948.

In the subsequent years, the size of the ASA budget has grown with expanding services to nearly $75,000 for the 1958 calendar year and considerable strides have been made toward building some financial reserves. The goal is to have an invested reserve in an amount roughly equivalent to one year's total expenses. At the moment, we have about 60 per cent of the reserve goal.

Understandably, there may be some differences of opinion as to the need to build this financial reserve, but the Board and Council have consistently agreed in recent years that any other course would threaten to undermine the entire ASA program in the event of temporary loss of income.

As we look to the future and visualize rising operating costs (including the recent postage boost) and an expanded program of publications and other activities, some financial problems begin to loom. An increase in membership helps greatly to increase income and offset rising costs, but there is still comparatively little margin left from a member's dues after the costs of present services have been met. There is even now the prospect of a small deficit this year, principally because of the enlarged size and costs of publications.

Each member should take time to evaluate the ASA services he is receiving from all levels and sections of the organization. I am deeply impressed by the responsiveness of the officers and directors to the desires of the membership. But these must be made known before programs and policies can be adjusted, and by the vast majority of the members and not just a few.

To date this year, member comments coming to my attention have uniformly involved requests for more services and activities. This is as it should be in a rapidly growing professional association. But we must not lose sight of our budgetary problem. During the past few years, a number of professional societies facing similar problems have found it necessary to increase dues. This step may have to be taken by the ASA.

It is our earnest desire to keep the ASA growing and financially strong. The record provides a basis for real encouragement. But in the end, the strength of ASA lies in the continued enthusiasm of its members. If you have any ideas or suggestions as to how we can make the ASA still more effective, won't you send them to me soon?

OPPORTUNITIES

for

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in the field of

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Ode to the Random Number

No shreds of dignity encumber
The undistinguished random number
He has (so sad a lot is his)
No reason to be what he is.

Kenneth Boulding

NEWS ABOUT MEMBERS

Om P. Aggarwal has returned to Purdue University as Associate Professor after spending two academic years in Canada at the Universities of Alberta and Saskatchewan. At Purdue University, Professor Aggarwal will be associated with the establishment of a Sampling and Survey Research Center. The main objective of this Center will be to coordinate the numerous survey activities at Purdue University and to provide further facilities for training and research to students interested in this field of statistics.

Abraham Aidenoff is serving as a Consultant at the United States Census Bureau until the end of 1958, at which time he will return to the U. N. Statistical Office.

Harvey Albond, formerly Research Analyst for the Minnesota Department of Employment Security, has been appointed Planning Analyst in charge of Research for the Des Moines Plan and Zoning Commission.

Robert Anthony has been on leave of absence teaching at the Management Development Institute in Lausanne, Switzerland for the past year. He will return to Harvard Business School on September 1.

H. J. Arnold has accepted an appointment as Assistant Professor in the Department of Mathematics, University of Western Ontario, London, Canada.

Kathryn S. Arnow is in charge of a new unit at the National Science Foundation which will integrate and analyze on a national basis the data on research and development funds and personnel obtained from surveys on various sectors of the economy.

William A. Aronow is now New Product Testing Manager in the Product Research Department, Research and Development Division, International Latex Corporation, Dover, Delaware.

Berton E. Barker, formerly with Sandia in Albuquerque, New Mexico, is now with the Livermore Branch of the Sandia Corporation, Livermore, California. His position involves statistical consulting service for the engineering staff.

John T. Bennett has recently been assigned to a new foreign service post—that of Program Economist to the ICA Mission in Tunisia. The assignment includes developing the economic data and providing the economic analysis on which the whole aid program in Tunisia is based.

Morton Boisen, formerly Chief of the Processing Operations Branch in the Population Division, has been named Chief of the Methods, Procedures and Quality Control Branch in the new Decennial Operations Division, Bureau of the Census.

Raymond V. Bowers, who has been in the Federal service since 1942 with the Selective Service System and the Department of Defense, has joined the staff of the University of Georgia as head of the Department of Sociology and Anthropology. Dr. Bowers' last government assignment was Technical Director of the Air Force Personnel & Training Research Center, Lackland Air Force Base, Texas.

William E. Bradford of the International Statistical Programs Office, Bureau of the Census, who has been Statistical Adviser to the Government of Peru since 1955, has transferred to the International Cooperation Administration to serve as Program Officer on the staff of USOM in Tegucigalpa, Honduras.

Dermott A. Breault has recently returned to Sylvania Electric Products Co., following a six month tour of duty with the U. S. Army. He is currently employed as a programmer in the Data Processing Laboratory at Waltham, Massachusetts.

Robert R. Breeding is now Budget Director at the Ziff-Davis Publishing Company.

J. Thomas Breen, formerly Chief of the Farm Products Branch, Agriculture Division, Bureau of the Census, has transferred to the Foreign Trade Division, Office of the Chief, as a Survey Statistician.

Margaret L. Brew has resigned as head of the Household Management Branch, Household Economics Division, Agricultural Research Service, USDA, to become head of the Department of Textiles and Clothing at the New York State College of Home Economics, Cornell University.

Lawrence D. Briggs, formerly a Budget Analyst with the Boeing Airplane Company, Wichita, Kansas, is now Contracts Administrator for the Hughes Aircraft Company, Tucson, Arizona.

Benjamin Buchbinder, formerly with the U. S. Public Health Service, is now with the Martin Company, Field Support Section, Missile Master Project, in Orlando, Florida, employed as a statistician primarily concerned with the reliability of complex electronic equipment.

Edward G. Buck, formerly with the Employment Security Department at Olympia, Washington, has been appointed Acting Chief of the Actuarial Methods and Estimates Branch, Division of Actuarial and Financial Services, Unemployment Insurance Service, U. S. Bureau of Employment Security.

E. Douglass Burdick, Professor of Statistics at the University of Pennsylvania, is on leave, working with the Health Division of the Planning Commission, Government of India, trying to develop data to be used in health planning in India. One of his projects involves an attempt to estimate the rural population and the birth, death, and net natural increase rates of the Indian rural population from a sample of about 2.5 million rural people.

Leonard R. Burgess is now an Instructor in Economics at the Bernard M. Baruch School of Business. He is also completing his doctoral dissertation at the Columbia University School of Business.

Douglas G. Chapman has a Visiting Professorship with the Institute of Statistics and will be located at North Carolina State College for the coming academic year. He will be working particularly on wildlife and fisheries problems.

C. West Churchman has accepted an appointment as Professor of Business Administration at the University of California, Berkeley, California. He was previously Professor of Engineering Administration at Case Institute of Technology, Cleveland, Ohio.

John C. R. Clapham has left Dunlap and Associates in Stamford, Connecticut to head an operations research group at the British Columbia Research Council. The aim is to develop operations research projects in industries in the province.

Jerome Cornfield, Assistant Chief of the Biometrics Branch of the Division of Research Services at the National Institutes of Health, has been appointed to two professorships at the Johns Hopkins Medical Institutions, effective July 1. He will become Professor and Chairman of the Department of Biostatistics in the School of Hygiene and Public Health, succeeding William G. Cochran. He will also have a newly created appointment, that of Professor of Biomathematics in the School of Medicine. This dual appointment reflects the increasing importance attached to the field of applied mathematics in these institutions and the strength envisioned if there is a unified development.

Milton I. Coven has transferred from the Bureau of Aeronautics, Navy Department, to the Population Division, Bureau of the Census, as a Survey Statistician.

Gertrude M. Cox, Director of the Institute of Statistics, Consolidated University of North Carolina, was awarded an honorary Doctor of Science degree by Iowa State College during its Founder's Day centennial observance; she was cited as "teacher, researcher, leader and administrator in the field of statistics".

John T. Dailey, formerly Technical Director of Research with the Bureau of Naval Personnel, has joined the staff of the American Institute for Research, where he will act as Program Director for the research on the identification, development, and utilization of human talents. He will be working at the Washington office of the Institute.

Lincoln H. Day will be Visiting Assistant Professor of Sociology at Princeton University for the academic year 1958-59, on leave from Mount Holyoke College.

Lewis N. Dembitz has been designated Research Associate in the Division of Research and Statistics of the Board of Governors of the Federal Reserve System.

W. Edwards Deming was awarded the degree of Doctor of Laws honoris causa by the University of Wyoming on June 2, 1958. The citation referred to Dr. Deming's invaluable service to the governments and industries of the post-war world and to his contributions in quality control, sampling and the theory of least squares.

Norman R. Draper obtained the degree of Doctor of Philosophy in Mathematical Statistics from the University of North Carolina in June 1958. He is now employed by Imperial Chemical Industries (Plastics Division), Welwyn Garden City, Herts., England.

Charles W. Dunnett has been awarded an educational grant from the American Cyanamid Company to do statistical research at the University of Aberdeen under Dr. D. J. Finney. He will be on leave of absence from his position as Head of the Statistical Group at Lederle Laboratories, a division of American Cyanamid, during the course of this research.

Sidney Epstein is now an engineering psychologist in the Missiles Systems Division of Lockheed Aircraft Corporation in Palo Alto, California. He is a staff consultant on human factors in the design of equipment.

Edward Eustice, formerly supervising statistician with the University of Wisconsin, Office of Student Personnel Statistics and Studies and Registrar Student Statistics, resigned to join the faculty of the Mathematics Department of North Dakota State teaching applied statistics.

Philip Faucett has left the faculty of the School of Business Administration at Northwestern University to become Senior Consultant and Economist of Wolf Management Engineering Company with headquarters in Chicago.

Bruce M. Fowler, formerly with the Business and Defense Services Administration, has joined the staff of the National Income Division of the Office of Business Economics.

John E. Freund has recently been appointed Chairman of the Department of Mathematics of Arizona State College at Tempe.

Lowell T. Galt has completed a 2-year assignment as Principal Statistical Adviser with US/OM Pakistan and returned to his former position as Assistant Director for Operations, Bureau of the Census.

Frederick Gehlmann has been elected an Associate of A. T. Kearney & Company, management consultants, Chicago, Illinois.

Leon S. Geoffrey has transferred from the Office of Field Services, Department of Commerce, to the Office of Assistant Secretary for Administration, as Assistant Emergency Planning Coordinator (Mobilization).

A. H. Gepfert, formerly with the Operations Research Group at Case Institute, has joined the new management of Chicago and North Western Railway Company as Director of Statistical Research. He is particularly concerned at present with developing long-range forecasts of freight revenues.

John E. Gessford is working for the International Paper Company as a financial trainee.

Joseph M. Gillman was one of the winners in a contest conducted by the Committee for Economic Development on the question: "the most important economic problem to be faced by the United States in the next twenty years".

Thomas A. Goldman, formerly with the Rand Corporation, Santa Monica, California, is now with the Corporation for Economic and Industrial Research, Arlington, Virginia.

Robert L. Goldsmith, Statistician with Sylvania Electric Products, Inc., Towanda, Penna., has received a M.S. in Applied Statistics from Villanova University.

Harold Goldstein, Assistant Chief for Analysis, Division of Manpower and Employment Statistics, Bureau of Labor Statistics, has returned from Paris where he prepared a report for the OEEC on European and U. S. methods in estimating future demands for scientists and engineers.

Martin Grayson, former International Vice President, Amalgamated Lithographers of America, is now employed by Printing Developments, Inc., subsidiary of TIME, Inc. He is Regional Manager of the Midwest area, covering both Plate and Electronic Scanner divisions.

Donald Guthrie, Jr. is Assistant Professor of Mathematics and Mechanics, U. S. Naval Post-graduate School, Monterey, California.

F. A. Harper is with the William Volker Fund. His new work will be research and analytical reports, primarily having to do with problems of voluntary welfare development in social science areas.

Abe Hassan, formerly Statistical Analyst at the Los Angeles City Department of Water and Power, and Assistant General Manager, M&P Auto Parks, is now employed as Senior Systems Analyst in the Product Development Department of the National Cash Register Company's Electronics Division in Hawthorne, California.

Millard Hastay is Associate Professor of Economics in the Department of Economics, State College of Washington, Pullman, Washington.

Delbert C. Hastings is leaving his position as Manager, Research Department, Federal Reserve Bank of St. Louis, to become Associate Professor of Statistics, School of Business Administration, University of Minnesota.

David L. Heck is now employed by the IBM Corporation in the Scientific Computation Laboratory of the Endicott Product Development Laboratory, Endicott, New York.

Henry Herz, consultant in business regulation matters, is now permanently located in the Washington, D. C. area, but continues to maintain an office in Hoboken, New Jersey.

Donald R. Herzog is employed as a marketing specialist with the Solar Aircraft Company, San Diego. He is also a part-time lecturer in management in the Evening Division of San Diego State College.

Werner Z. Hirsch, Associate Professor of Economics at Washington University, is on a leave of absence from his university position. He served during the summer as a consultant to the Rand Corporation in Santa Monica and is spending the coming year on the staff of Resources for the Future, Inc., in Washington, D. C.

H. S. Houthakker will be on leave from Stanford University during the academic year 1958-59 to act as Visiting Professor of Political Economy at Harvard University.

John A. Howard has moved from the University of Chicago to become Professor of Marketing at the School of Business Administration, University of Pittsburgh.

John R. Howell's new position is Head of the Computer Section, Data Processing Division, University of Dayton Research Center.

A. J. Jaffe is at the UN/FAO Census Training Center, No. 1 Motofujicho, Bunkyo-ku, Tokyo, Japan. His stay is from August 25 to December 1958.

W. E. Jaynes serves as Director of the Bureau of Industrial Testing and Institutional Research at the University of Omaha. The purpose of the Bureau is to assist local businessmen in development and application of psychological and statistical tools. He also teaches Statistics and Industrial Psychology at the University.

William A. Jenner has transferred from Andrews Air Force Base, Maryland, to Scott Air Force Base in Illinois, in connection with the move of Headquarters Air Weather Service. He serves as educational advisor to the Air Weather Service.

Pao-Kung Jui of China is in the United States for a 6-month period of study on a Fellowship for Advanced Training under the expanded Program of Technical Assistance of the International Labor Organization. Mr. Jui is Chief Statistician of the Ministry of Interior of the Republic of China, Taiwan. The objective of his stay in the United States is the study of the various fields of labor statistics, with special emphasis on manpower and employment statistics.

Homer Jones has been appointed a Vice President of the Federal Reserve Bank of St. Louis effective July 1, 1958. In that capacity Mr. Jones will be responsible for the Research Department.

Howard L. Jones has retired from the Illinois Bell Telephone Company and has accepted a position as Professor of Statistics, School of Business, University of Chicago.

Thomas A. Jones is now with the Operations Research Group in the Department of Research and Development of Kimberly-Clark Corporation, Neenah, Wisconsin. His responsibilities concern the organization of a digital computer programming section and the development and implementation of digital computer applications for the pulp and paper industry.

Hyman Kaitz, recently with the International Bank for Reconstruction and Development, has joined the staff of the Division of Manpower and Employment Statistics, Bureau of Labor Statistics, as a Statistical Consultant.

Robert J. Keehn has resigned as Director of the Bureau of Vital Statistics, Connecticut State Department of Health, to join the staff of the Follow-Up Agency of the National Research Council, Washington, D. C.

Arthur S. Kraus is now Director, Division of Vital Records and Statistics, State of Maryland Department of Health.

E. O. Lail, Jr., formerly with the C&P Telephone Company of West Virginia, accepted a position with the Comptrollers Department of the American Telephone and Telegraph Company in New York.

Herman Lasken has transferred from the Review and Analysis Group, Office Chief of Staff, Army, to a new position as Acting Director, Manpower Office, Resources

and Requirements, Federal Civil Defense Administration, Battle Creek, Michigan.

John M. Leiman has resigned his position with Personnel Laboratory of Wright Air Development Center and accepted a position as Social Scientist with System Development Corporation of Santa Monica, California.

Charles T. Lewis has recently accepted a position as Operations Analyst in the Operations Research Group at Convair in Fort Worth, Texas.

Alfred Lieberman, formerly with the Bureau of Ships, has now joined the staff of the Institute for Defense Analyses, Washington, D. C.

David Kevan Lloyd is now a member of the Technical Staff of The Ramo-Wooldridge Corporation, working on reliability studies in the Astrosciences Laboratory within the Space Technology Laboratory.

Laurance G. Locke is now associated with the Statistical Department of the Production Planning Division of Eastman Kodak Company. The work involves the development of mathematical and economic models for optimum inventory and production levels, also the use of operation research methods in the phases from production to final sale. Mr. Locke was previously with the George Washington University Department of Statistics.

Ernest W. Luther has joined the staff of the International Statistical Programs Office, Bureau of the Census. He will serve in Teheran, assisting the National Bank of the Government of Iran in establishing and revising its statistical program.

C. F. MacGuire, who has been in charge of the UN Statistical Yearbook, has retired from the Statistical Office of the United Nations after 28 years as an international civil servant.

William G. Madow of the Stanford Research Institute has been appointed as a consultant in the Office of the Assistant Director for Statistical Standards, Bureau of the Census.

Clifford J. Maloney, formerly Chief, Statistics Branch, has been appointed Chief of the Mathematics Division, U. S. Army Biological Warfare Laboratories, Fort Detrick, Frederick, Maryland. The newly-constituted Mathematics Division has absorbed the former Statistics Branch of the Allied Sciences Division.

Margaret P. Martin has taken a position as Associate Professor of Preventive Medicine (Biostatistics) at the Upstate Medical Center of the State University of New York at Syracuse. She was previously at Vanderbilt University.

Charles Martinez has joined the Sampling and Estimating Methods Section, Statistics Division, Internal Revenue Service, Washington, D. C.

John W. Mayne, who has been Director of Operational Research with the Royal Canadian Navy at National Defense Headquarters, Ottawa, for the past 2 1-2 years, has been posted to the SHAPE Air Defense Technical Centre, The Hague, Netherlands, to be Chief of an Operational Research Section staffed by scientists from various NATO countries. He expects to be in Europe about three years.

Morton A. Meyer, who has completed a three-year assignment as National Census Adviser with US/OM Uruguay, has been named Chief of the Computer Programming Branch in the new Decennial Operations Division, Bureau of the Census.

Irwin Miller has been appointed Associate Professor of Mathematics at Arizona State College, Tempe, Arizona.

George Minton, formerly with the Office of the Quartermaster General, Department of the Army, is now a Mathematical Statistician in the Economic Operations Division, Bureau of the Census.

Judy Moss has recently joined the staff of the City of Philadelphia to head a new division, the Integrated Data Processing Division, to develop and implement an integrated, electronic data processing program for the City.

Ingram Olkin is on a sabbatical leave from Michigan State University and is at the Department of Statistics, Stanford University.

Guy H. Orcutt has joined the faculty of the University of Wisconsin as Professor of Economics. His initial teaching will be in the area of business cycles and fiscal policy.

David Pittman has joined the Department of Sociology and Anthropology, Washington University, St. Louis, as Assistant Professor.

James D. Powers is the statistician for General Electric's Automatic Blanket plant at Asheboro, North Carolina. His duties involve quality control analysis, manufacturing forecasts and general statistical analysis of production problems.

Orville O. Price has transferred from the Reports and Statistics Service, Office of the Controller, to the Department of Veterans Benefits, Veterans Administration.

Leon H. Pritzker is on a part-time assignment with the Statistical Research Division, Bureau of the Census, as a supervisory mathematical statistician.

Albert J. Reiss, Jr. has a new position as Professor of Sociology and Director, Iowa Urban Community Research Center.

Benjamin Reiss is presently working in the Tracking Section of the Computation Laboratory of the U. S. Army Ballistic Missile Agency at Redstone Arsenal, Alabama. His work consists of programming for several large IBM digital computers and applying statistical methods such as quality control and time series analysis.

Paul R. Rider was one of the lecturers for a 6-weeks' course on mathematical statistics given at the Air Force Missile Development Center, Holloman Air Force Base, New Mexico, during July and August.

Benjamin Rosner has accepted a position as Assistant Professor of Educational and Psychological Measurements and Research at Rutgers University. He will teach courses in measurement and statistics and will guide doctoral students on the research aspects of their dissertations.

Ernest Rubin, Chief of the Eastern European Section, Office of Economic Affairs, Bureau of Foreign Commerce, has returned from a two-month U. S. trade mission to Poland.

Israel Rubin, formerly with the Air Materiel Command, Wright-Patterson Air Force Base, has joined the Office of Statistical Standards, Bureau of the Budget. He will work on education statistics and problems of establishment reporting.

Jack Sawyer, Personnel Research Branch, The Adjutant General's Office, Department of the Army, has been awarded a Postdoctoral Fellowship in Statistics at the University of Chicago for the year 1958-1959.

Henry Scheffe of the University of California will be Visiting Professor at Princeton University for the academic year 1958-59, where his work with the Statistical Techniques Research Group will be partially supported by a grant from the National Science Foundation.

Emil D. Schell, formerly with Remington Rand UNIVAC, has accepted a position with IBM Research as an advisory mathematician to work on the theory of machine organization.

Bruno A. Schiro, formerly with the Division of Agricultural Economics, Agricultural Marketing Service, has joined the staff of the International Statistical Programs Office, Bureau of the Census, for assignment with USOM to the Government of Iran.

Helen E. Scott is with Army Medical Statistics, Office of the Surgeon General.

Henry S. Shryock, Jr., Assistant Chief of the Population Division, Bureau of the Census, has returned from a six-months assignment for the United Nations in Bombay where he participated in the teaching and research activities of the Demographic Teaching and Research Centre, sponsored jointly by the U. N. and the Indian Government.

Joel Smith, formerly Assistant Professor in the Department of Sociology and Anthropology at the Michigan State University, is now Associate Professor in the same department at Duke. His new duties include the teaching of courses in research methodology and statistics for departmental graduate students and consulting on problems of research design arising in departmental research problems.

James E. Smithson is now employed with the Human Factors Group, a part of Boeing Aircraft Company's newly-formed Product Design Section, in the Seattle Division. He will head the Human Factors Laboratory, devoted to research in manned flight efficiency and safety for systems under development.

Boyd M. Sneddon began working for General Mills on July 1. He is a statistical analyst in the Special Surveys Section of the Marketing Research Department.

George W. Snedecor, who was primarily responsible for the development of the Iowa State College Statistical Laboratory, was awarded an honorary Doctor of Science degree by the college during its Founder's Day centennial observance and cited as "teacher, author, pioneer in experimental statistics." He has been a visiting professor at North Carolina State College, in the Institute of Statistics, since 1957.

Herbert Solomon will spend the academic year 1958-59 at the Applied Mathematics and Statistics Laboratory, Stanford University, California, on leave of absence

from Teachers College, Columbia University.

Morris J. Solomon, formerly with American Greetings Corporation, has joined the staff of Atlas Powder Company, Wilmington, Delaware, as an Operations Research Analyst.

James F. Stakem, formerly of the Statistical Techniques Laboratory Section, has joined the staff of the Income, Finance, and Wealth Branch, Statistics Division, Internal Revenue Service, as an analytical statistician.

Julian C. Stanley, Professor of Education at the University of Wisconsin in Madison, has been appointed a Fulbright Act research grantee in educational psychology for the academic year 1958-59 to work with Professor Raymond Buyse at the Psycho-Pedagogical Laboratory of the Catholic University of Louvain, Belgium.

Clyde E. Starr, formerly a student at Hobart College, Geneva, New York, is now employed by Oppenheimer & Company, member firm of the New York Stock Exchange.

Seiji Sugihara's new position is Research Specialist, Lockheed Missile Systems Division, Sunnyvale, California.

C. Meryl Sullivan's new position is Executive Vice President, National Wholesale Dry Goods Association, New York City.

Markis K. Supple, formerly with the Department of Defense, has joined the staff of the Income, Finance and Wealth Branch, Statistics Division, Internal Revenue Service, as an analytical statistician.

E. J. Talbert, formerly Acting Chief of the Program and Requirements Branch, Business and Defense Services Administration, has been named Chief.

Marvin W. Towne has been employed by the International Statistics Programs Office of the U. S. Bureau of the Census, since June, assigned as advisor to the Bank Melli, Iran, on the revision of their wholesale price index.

Malcolm E. Turner has joined the Department of Biophysics, Medical College of Virginia, Richmond. He teaches statistics to medical students and graduate students and helps to coordinate the biometrics training program which is being offered jointly by the Virginia Polytechnic Institute and the Medical College of Virginia.

Marshall A. Turoff has joined Booz-Allen & Hamilton, Management Consultants, Chicago, as a marketing consultant. He was previously Director of Marketing Research, Ohmite Manufacturing Company, Skokie, Illinois.

Dik Warren Twedt has been elected President of the Chicago Chapter of the American Marketing Association. A psychologist and account executive at Leo Burnett, Inc., Dr. Twedt was also recently appointed business manager of the Journal of Marketing, official publication of the American Marketing Association.

Bert Van Uitert has joined the Research Staff of the New England Mutual Life Insurance Company, Boston, as Marketing Research Manager.

David I. Verway is working toward a Master's degree in economics at Michigan State University.

John E. Walsh, formerly with the Military Operations Research Division of Lockheed Aircraft Corporation, is now with the Operations Research Group of The System Development Corporation, Santa Monica, California.

Marie D. Wann, formerly with the Office of Education, has been appointed as mathematical statistician in the Population Division, Bureau of the Census.

Walter B. Watson's new position is Acting Assistant Professor of Sociology, University of Washington, Seattle, Washington.

Kenneth W. Webb, formerly a mathematical statistician with the Bureau of Aeronautics, has been appointed mathematical statistician with the Corporation for Economic and Industrial Research, Arlington, Virginia.

Philip W. Wenig has accepted the position of Director of Marketing and Research, Harold Cabot Advertising Agency, Boston.

Kenneth B. Williams has been designated Associate Adviser of the Division of Research and Statistics, Board of Governors of the Federal Reserve System.

W. H. Williams has resigned his position as Assistant Professor of Statistics at Iowa State College to become Assistant Professor of Mathematics at McMaster University, Hamilton, Canada.

William H. Wilson is now an Operations Analyst in the Combat Operations Research Group of the U. S. Continental Army Command, Fort Monroe, Virginia.

Thomas J. Woofter, prominent demographer, retired in July after 24 years in Government service.

CHAPTER NOTES

Albany

The annual business meeting of the Chapter was held on June 9th. Topics covered included committee reports, election of officers, and discussion of plans for the 1958-59 year. The following officers were elected:

President—HERBERT L. BRYAN, N. Y. State Department of Correction

Vice-President — CYNTHIA M. PENSE, N. Y. State Department of Mental Hygiene

Secretary — HERMAN SOLOMON, N. Y. State Department of Social Welfare

Treasurer—HELEN CHASE, N. Y. State Department of Health

Central Iowa

The new Central Iowa Chapter, composed of ASA members in the Ames-Des Moines area, had its first meeting after receiving its ASA charter on May 21st at the Iowa State College Memorial Union in Ames. The evening program was co-sponsored by the College's Statistical Laboratory Seminar. It included a panel discussion of members' statistical problems by six staff members of the College: Karl Fox, head of the Department of Economics and Sociology; Gerhard Tintner, Professor of Economics, Mathematics and Statistics; and, from the Statistical Laboratory, Professors John Gurland, H. O. Hartley, Paul G. Homeyer and O. Kempthorne.

Central New Jersey

A panel meeting was held at Princeton University May 27th on "Preparation and Use of Current Estimates of Populations in New Jersey State Government". The speakers were Mrs. G. W. Ellsworth, Chief of Research and Statistics, Conservation and Economic Development; Wesley R. Bellis, Chief of the Traffic Design and Research Section, Highway Department; Douglas H. MacNeil, Chief of the Bureau of Social Research, Institutions and Agencies; F. Merton Saybolt, Chief of the Bureau of Public Health Statistics; and David S. Winans, Chief of Research and Statistics, Education Department.

The following officers were elected for 1958-59:

President—FRANK J. ANSCOMBE, Princeton University

First Vice-President (Program)—FREDERIC M. LORD, Educational Testing Service

Second Vice-President (Trenton)—GLADYS ELLSWORTH, Conservation and Economics Development, New Jersey

Secretary-Treasurer — REUBEN COHEN, Opinion Research Corporation

Chicago

A joint luncheon meeting with the Chicago Chapter of the American Marketing Association was held on June 5th. The speaker was Mrs. Dorothy S. Brady, currently with the Department of Economics, University of Chicago, and formerly Chief of the Division of Prices and Cost of Living, U. S. Bureau of Labor Statistics. Mrs. Brady's subject was, "The Effect of Income and Age on the Quantity and Quality of Clothing Purchased".

The last dinner meeting of the 1957-58 season, the annual economic forecast meeting, was held on June 12th. The business outlook for the last half of 1958 was discussed by Fred M. Westfield of the Economics Department, Northwestern University and M. Dutton Morehouse, Manager, Brown Brothers, Harriman & Company. Members of the chapter had previously been invited to send in their own forecasts of four key economic indexes—total personal income, total civilian employment, the FRB industrial production index, and the BLS wholesale price index. These forecasts were summarized at the meeting.

Columbus

The following persons have been elected officers of the Chapter for the year 1958-59:

President—JAMES C. YOCUM, Ohio State University

First Vice-President—DR. WILLIAM O. ANDERSON, The Ohio National Bank

Second Vice-President—CATHERINE G.

McGuire, Attorney at Law
Secretary-Treasurer—Dr. Michail Condoide, Ohio State University

Connecticut

The following officers for the year 1958-59 were elected at the Annual Meeting:

President—Colin White, Hamden, Connecticut
Vice-President — Robert R. Kirkland, Southern New England Telephone Co., New Haven, Connecticut
Secretary-Treasurer—Royal A. Crystal, Connecticut Medical Service, Inc., New Haven, Connecticut

Colorado-Wyoming (formerly Denver)

A dinner meeting was held on June 5th. Awards of student memberships in the American Statistical Association were given to senior students from Denver University, Colorado State College, the University of Colorado and the University of Wyoming. These are made by the Maurice Davies Memorial Award to students who have done superior work in statistics. The speaker of the evening was Dr. David Hawkins of the University of Colorado, whose subject was "A Maze Model of Scientific Induction".

Detroit

The Chapter heard Dr. Rensis Likert, Director of the Institute for Social Research at the University of Michigan and President-Elect of the American Statistical Association, speak at its May 21st meeting. Dr. Likert's subject was "The Management of Scientific and Statistical Personnel".

Hawaii

At the dinner meeting hold on June 12th the speaker was Richard H. Clark, Assistant Professor of Mathematics at the University of Hawaii. Professor Clark's topic was, "The Explanation and Application of the Analysis of Variance".

Montreal

On March 12th, A. A. Curtis, Chief Statistician, Canadian National Railway, J. J. Brennan, Staff Supervisor—Statistics—Bell Telephone Co. of Canada, and R. Edsall, Marketing Consultant, were the panel members in a discussion about the "Presentation of Statistics to Management".

Professor Earl Beach of McGill University was the speaker at the April 9th meeting. He presented a very interesting talk on "Economic Models" about which he recently published a book.

The discussion group (a sub-group of the Chapter members who are interested in technical topics) had two meetings recently. The first one was devoted to the application of a method of dealing with multiple regression originally proposed by Dr. J. Shapiro. The second one had Dr. Gilbert Paul of McGill University presenting some thought about "Transformations" and leading the fruitful discussion that followed.

The annual meeting, which took the form of a dinner-meeting for the first time in the history of the Chapter, was held on May 7th. The members were fortunate to hear Howard L. Jones, Vice-President of the A.S.A., talk about the activities of the parent organization. Mr. Jones also presented a solution to some of the problems connected with non-representative samples. A lively discussion followed.

The following officers for 1958-59 were elected:

President—Prof. Roger Lessard, Ecole Polytechnique
Vice-President—Robert A. Bandeen, Canadian National Railways
Secretary—Dr. Jacques St-Pierre, University of Montreal
Treasurer—Donald J. Porter, Canadian Pacific Railways

New York

The following new officers were elected at the annual meeting of the Chapter held on May 7th:

Vice-President—A. J. Jaffe
Treasurer—Virginia Holran
Member of the Executive Council—Herbert Bienstock

The Chapter President, Douglas Greenwald, and the Secretary, Sidney Sameth, will continue in office for another year, as will Executive Council members Robert E. Johnson and Robert E. Lewis.

Philadelphia

The Chapter held its final dinner meeting of the season on May 21st. Mr. Louis J. Paradiso, Assistant Director and Chief Statistician of the Office of Business Economics, Department of Commerce, spoke on "The Business Outlook". Mr. Paradiso provided a detailed analysis of the recession and the recent behavior of economic indicators.

Dr. Franklin P. Kilpatrick, Manager of the Consumer Research Group and Director of the Psychological Laboratory, National Analysts, Inc., was the speaker at a dinner meeting on April 16. His topic was "Consumer Survey Research—Procedures, Problems, and Trends". Dr. Kilpatrick's discussion centered on new developments and their implications for the future of consumer research.

Newly elected officers for the year 1958-59 are:

President—Dr. Benjamin J. Tepping, National Analysts, Inc.
Vice-President — Dr. Stanley Schor, University of Pennsylvania
Secretary-Treasurer — Richard W. Glancy, Bell Telephone Company of Pennsylvania

Pittsburgh

At its January meeting, the Chapter was addressed by Dr. Peter Armitage, Visiting Scientist, National Cancer Institute, who spoke on "Sequential Experimentation". The speaker at the February meeting was Dr. Donald Gaver, of Westinghouse Research Laboratories; his subject was "Statistics in Inventory and Production Control". In March, Dr. Duncan C. McCune, Jones and Laughlin Steel Corporation, spoke to the group on "The Use of a High Speed Computer in Statistics". For the April meeting, Dr. W. H. Clatworthy, Westinghouse Electric Corporation, described "Incomplete Block Designs". At the season's final meeting in May, Dr. Dankward Kodlin, Graduate School of Public Health, University of Pittsburgh, spoke "On the Interpretation of Tumor Induction Experiments".

The following officers were elected for 1958-1959:

President—Dr. C. C. Li, Graduate School of Public Health, University of Pittsburgh
Vice-President — Herbert Ginsburg, Westinghouse Electric Corporation
Treasurer—Dr. Thomas A. Elkins, Gulf Research and Development Company
Secretary—Dr. Isidore Altman, Graduate School of Public Health, University of Pittsburgh

Rochester

New officers of the Chapter for the 1958-59 year are:

President — Robert O. Welk, Eastman Kodak Company
Vice-President — Dr. Lionel McKenzie, Department of Economics, University of Rochester
Secretary-Treasurer—Donald A. Wright, Eastman Kodak Company

St. Louis

A meeting was held on May 21st at which Victor A. Ellman, Director of Finance, University City, Missouri, discussed "Financial Implications of the Metropoltan St. Louis Survey". Mr. Ellman reviewed the recommendations of the Survey as they affected the governmental units within the metropolitan area, and summarized the advantages and disadvantages of accepting the proposals of the Survey. He emphasized the point that the Survey would not result in government at lower cost but that it was hoped it would bring a higher quality of governmental service.

At the June 18th meeting W. Massey, Applied Mathematics Department, Monsanto Chemical Co., spoke on "Computers and Statistics". Mr. Massey's talk dealt with the relationship of large scale computers and statistics, with special reference to applications.

Southern California

The May 29th dinner meeting was devoted to educational statistics and testing. Dr. Howard A. Bowman, Director of Evaluation and Research, Los Angeles City Schools, discussed "Educational Test Data", and John F. McGinnis, Director of Educational Housing, Los Angeles City Schools, spoke on "Pupil Enrollment Projection Techniques".

At the June 26th dinner meeting, W. N. Jones, Assistant Production Control Manager, Mercury Assembly Plant, discussed the subject, "Mass Producing Variety". In addition to the regular program there was a demonstration of the new Olivetti Calculator.

The last meeting of the 1957-58 season was held on July 31st. Mr. John S. Thompson, Market Research Analyst for the Southern California Division of the Coca Cola Company, spoke on "How the Coca Cola Company Uses Statistics in The Field".

mon averages with which the median is most often compared, it is especially important to investigate the sensitivity of such averages to special characteristics of universes, especially those of model theoretical types of universes whose special features may not be realistic. The importance of this type of study is further emphasized by the fact that medians are so often used in situations, where, for practical reasons, it is especially difficult to formulate a moderately realistic model universe for which careful comparisons of estimators can be made.

An interesting case of a practical situation in which special characteristics of a moderately realistic universe are worthy of study is provided by the universe of bolts screened by several inspection procedures. Assuming that the original distribution of diameters was nearly normal and that the screening processes have removed most of the extreme values, the resulting truncated distribution may be nearly rectangular. For any rectangular universe it is known that the mid range $(x_1 + x_n)/2$ is a superefficient maximum likelihood estimator of the universe mean or median. A person needing a good average for a sample of bolts would be tempted to make use of the superefficient midrange. Before doing this, however, he should investigate carefully the possible effects of extreme values not yet removed by the screening process and also the effects of lack of exact rectangularity, especially at the extremes. Allowance for these effects might eliminate most of the relative advantages of the midrange.

Summary

The median has many descriptive properties which are useful in their own right. The descriptive properties of the median are also helpful in the study of its sampling properties. The method of constructing confidence intervals for the unknown median of a sampled universe is elementary in principle and it is applicable to any universe. Sampling properties of the median depend chiefly on the degree of concentration of values of X near the median of the universe; they are remarkably insensitive to any other characteristic of the universe, especially in large samples. Difficulties present in symmetrical or slightly skewed universes are augmented by problems associated with differences between medians and means of universes which are highly skewed. For this reason, one should consider the possibility of bias when any sample average is used as an estimator of some other type of average for the universe. So far as lack of bias in the median is concerned, one can say that the median is "median unbiased;" that is, the median of medians is equal to the universe median for any type of universe.

EDMOND E. LINCOLN, economist for the Du Pont Company from 1931 until his retirement in 1953, died on May 15 at the ago of 70. A graduate of Ohio Wesleyan University, Mr. Lincoln did graduate work at Harvard and taught in the Graduate School of Business Administration there. He was the first Rhodes Scholar from Ohio, and upon his return from Oxford University he taught at Mount Union College in Ohio, and St. John's College, Annapolis, Md. Prior to joining the Du Pont Company, he had been economist for the Western Electric Company and the International Telephone & Telegraph Company. Mr. Lincoln was a life member of the American Statistical Association.

HELEN SLADE (Mrs. Helen Sanders), financial analyst and writer, died in New York City on July 18. Born in California, she had studied at the University of California and Columbia. She founded *The Analysts Journal* in 1944 and remained its managing editor until her death. She was formerly president of the New York Chapter of the American Statistical Association, and secretary of the New York Society of Security Analysts.

HOWARD R. TOLLEY, distinguished agricultural economist, died of cancer on September 18 at the age of 68. Mr. Tolley was a native of Indiana and a graduate of the University of Indiana. He served in the Department of Agriculture for more than 25 years, holding the positions of Administrator of the Agricultural Adjustment Administration from 1936 to 1938 and Chief of the Bureau of Agricultural Economics from 1938 to 1946. He left the Government to become first Chief of the Economics and Statistics Division of the Food and Agriculture Organization of the United Nations. When headquarters of the FAO were moved from the United States Mr. Tolley became a special consultant to the Ford Foundation and later consultant to the National Planning Association. He was a Fellow of the American Statistical Association and the American Association for the Advancement of Science and a Past President of the American Farm Economics Association.

FAITH M. WILLIAMS (Mrs. Frank Lorimer), Department of Labor economist, died of cancer at Cooperstown, N. Y. on September 20. Miss Williams received her B.A. degree from Wellesley College in 1915 and a Ph.D. from Columbia in 1924. She had been a member of the Bureau of Labor Statistics staff since 1934, and was chief of the Office of Labor Economics from 1952. Miss Williams had frequently represented the United States at international conferences, and last March was given the Department of Labor's Distinguished Service Award for her contributions to consumer economics. She was a Fellow of the American Statistical Association.

1958 MEMBERSHIP DIRECTORY

Shortly after this issue of THE AMERICAN STATISTICIAN reaches you, the 1958 Membership Directory of the American Statistical Association will also be in the mails. Every member of ASA will receive a copy gratis. Additional copies will be available for sale at $4.50 each. Non-members of the Association may also buy a copy of the Directory at that price. Send your orders to the American Statistical Association, 1757 K St., N.W., Washington 6, D.C.

SOME EXPERIENCE WITH ELECTRONIC COMPUTERS

—CONTINUED FROM PAGE 22

of the extent of the problem can be seen from the estimate of $20,000-$30,000 for completing the correction phase of the 1954 Census. Failure to end up with a corrected set of tapes for some items significantly limits the possibility of special tabulations subsequent to the Census, either by the Bureau itself for its analytical use in planning future Censuses or for business organizations and research groups on a reimbursable basis. The first organization requesting a special tabulation in such instances has to pay the cost of introducing the corrections in addition to the usual cost of the tabulation and related disclosure analysis. Not only does this result in an inequitable burden on the recipient of special tabulations and leave to chance whether the corrections will be made for any given part of the Univac record, but the lapse of time between the finding of the error and the carrying of it to the tape results frequently in the loss of the information or confusion as to the exact nature of the desired change. Sometimes it seems almost impossible to retabulate any set of cards or tape and come up with totals identical with already published information. However, where a card or tape correction program has been accomplished, the differences are typically statistically insignificant.

Some improvement in the correction program will occur in 1958 if, as everyone agrees, all of the data are placed on one Univac record rather than split up in three records as for 1954. The basic problem, however, is the need for searching through the tape for the small number of establishment records that need correction. The new scientific computer will have both advantages and disadvantages in this connection compared with the former Univac. On the positive side, the 1103 has a considerably larger memory potential and greater sorting ability. On the other hand, the machine manipulates data so much faster than its capacity to read in data, even with the buffers that are expected to help out in this regard, that there is likely to be a considerable amount of waiting time involved in making the corrections to tape.

The anticipated improvements in processing Census data for 1958 on the new computers described earlier create a need for better tape-to-card equipment and high-speed printer equipment. Most important of all perhaps, is the need for the Census staff to adjust its thinking to the added potentialities of the new machine and to realize that it opens up avenues of investigation and development not attainable before.

Despite our high hopes, a realistic appraisal of the use of the new computers in the 1958 Census leads to the conclusion that much will be lost because of the virtual impossibility of seeing far enough ahead and the exceedingly great cost of changing in midstream. The apparent cost and effort involved in modifying the computer procedures for a given operation, once they have been established, makes it highly undesirable to change the processing cycle. To the extent that each Census of Manufactures, is a "new" survey, this will continue to present problems that will be only partly solved. Nevertheless, it is our conviction that, all factors considered, the 1958 Census of Manufactures will benefit from the use of the electronic computer and the future census will be vastly improved.

STATEMENT REQUIRED BY THE ACT OF AUGUST 24, 1912, AS AMENDED BY THE ACTS OF MARCH 3, 1933 AND JULY 2, 1946 (Title 39, United States Code, Section 233) SHOWING THE OWNERSHIP MANAGEMENT, AND CIRCULATION OF **The American Statistician**, published 5 times yearly at Washington, D. C. for October, 1958.

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American Statistical Association.
by: Edgar M. Bisgyer, Office Manager.

Sworn and subscribed before me this 8th day of September, 1958.

Mary P. Windsor
Notary Public
(My commission expires April 14, 1959)